# modern railways

MARCH 65

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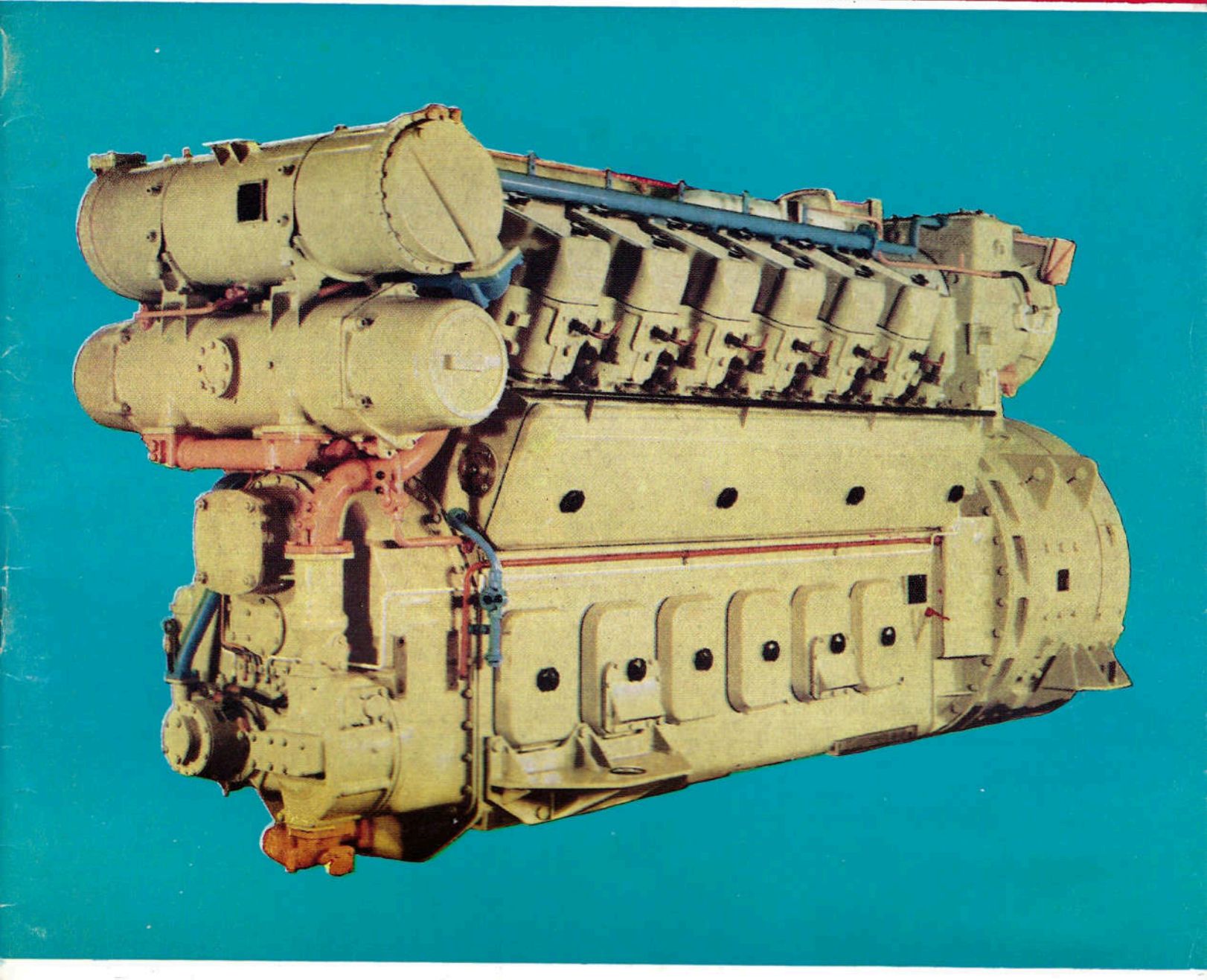

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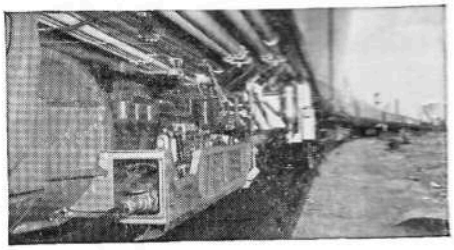

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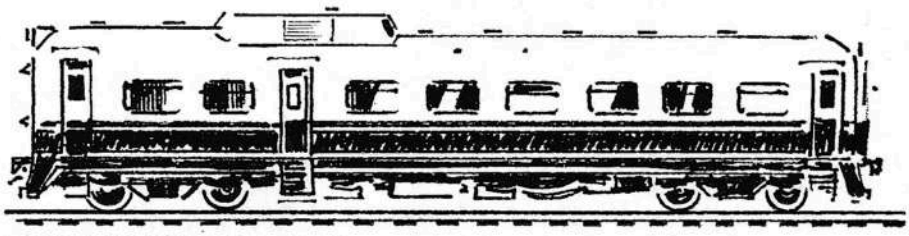

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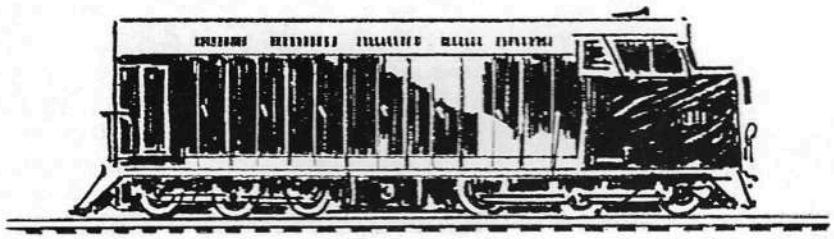

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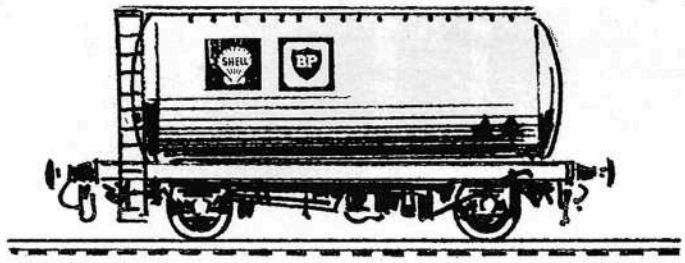

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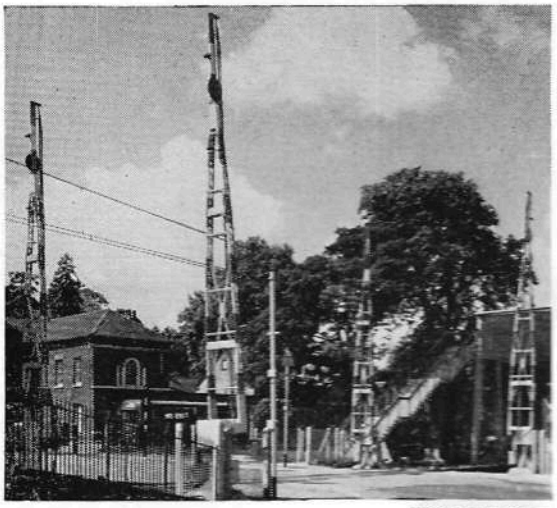
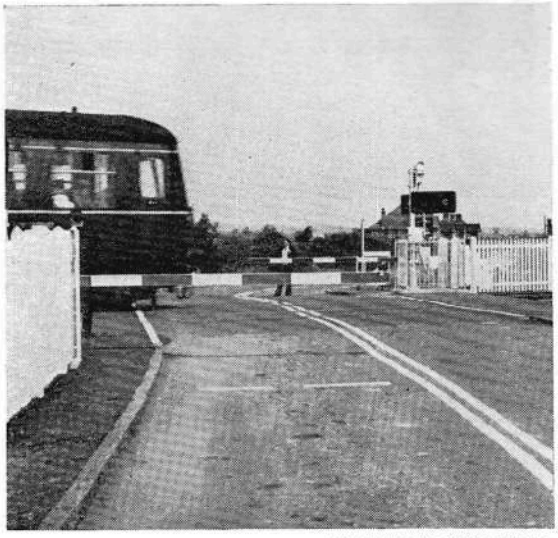


Ware, Eastern Region



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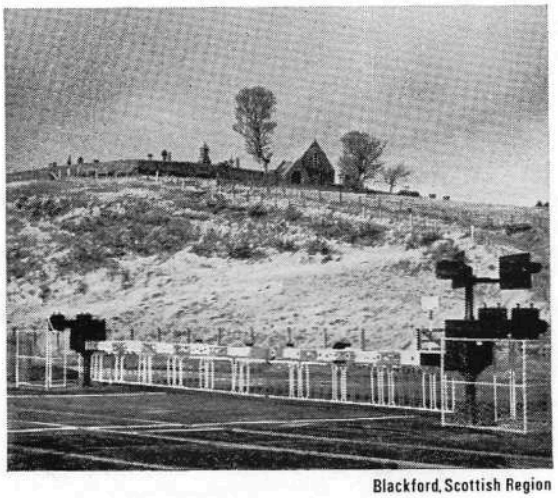

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modern railways

Incorporating THE LOCOMOTIVE RAILWAY CARRIAGE & WAGON REVIEW

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## CONTENTS

BR must respect their timetables 121
Letters 123
French Railways carry out more 150 m.p.h. trials 126
The Italians get ready for 112 m.p.h. inter-city running 127
Railway signalling and safety devices of the future 128
British Rail's campaign for Anglo-Irish traffic 132
Traffic Divisions of British Railways—3: Stoke Part 2 135
Powerful Hunslet diesel hydraulics for the NCB 139
Traffic control on the Gotthard Line 140
Liverpool–Southport electrics reprieved 149
Outlook for the Southern's passengers 150
How the Southern's electric multiple-units are maintained 154
Manchester cheap-fare experiment disappoints 161
Train running and traction performance 162
New type of neutral section saves BR £400,000 in a.c. costs 166
The Irish scene 167
Today and tomorrow 169
Beyond the Channel 174
New books 177
Traffic report 178

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# BR must respect their timetables

IN 1964 the European Timetable Conference decided that henceforward the timetables of its member administrations should be of two years' duration. The first of these biennial books, the Swiss, has now appeared in draft form—an invaluable service to the travel trade and ordinary members of the public planning summer holidays, which most Continental railways provide very early each year. Although the Swiss book includes the connecting services of numerous different administrations, the final printed version usually varies from the first draft only in sparse incidental detail. And on past experience of Continental timetables one does not expect that the promise of validity for two years will be seriously falsified.

Contrast this respect for published schedules with some BR items reported lately. In January the Western Region courageously swallowed its pride, admitted that its timetable of last autumn was so hopelessly invalidated by changes as to have become a deterrent to rail travel, and wisely produced a fresh one in mid-winter. Nevertheless, as a correspondent points out this month, one or two tables even in this costly new edition were promptly made worthless by changes on other Regions (and in total these January changes up and down BR, remember, needed a two-page feature article in last month's issue for full coverage). Elsewhere, the Southern Region, apparently because the replacement of the existing ship cannot be much longer delayed if the service is to continue, has shocked the travel trade by suddenly announcing a firm proposal for withdrawal of the Southampton–St. Malo service—admittedly under threat for some time—long after travel brochures for this summer's season that assume its continuance have been printed. And, as usual, more unremunerative services have this winter been cut from BR working on a widely varying collection of dates—but all of them within the advertised duration of a time-table book.

The recent highly-publicised "British Rail" display at London's Design Centre was designed to symbolise, amongst other things, the coherence of the entire BR service and the firm, unified managerial purpose behind it. This is still made a nonsense by one of the display's exhibits: new Regional timetables in a uniform British Rail size and format. Yet as the catalogue of BR's passenger products these are—or should be—one of the principal sales-aids. No other commercial enterprise would complacently let every fresh issue of its catalogue be quickly made suspect by pages of close-printed alterations. It is defeatist to argue that fewer passengers every year are prepared to buy their own timetable and that they now rely on travel agents and enquiry offices. It is still possible as well as essential to make the timetable book a best-seller by good presentation and promotion. Western Germany provides some supporting evidence. Stand as we have done in the concourse of Cologne or Frankfurt Hbf when a new issue of the DB book has

The funeral train conveying the body of Sir Winston Churchill from Waterloo to Handborough (for Bladon) via Staines Central, Reading and Oxford, after the state funeral at St. Pauls Cathedral on January 30, crosses the Thames at Richmond behind SR "Battle of Britain" Pacific No. 34051 *Winston Churchill*. *Photo by C. T. Gifford*

just been published and watch the stream of the public buying it from a kiosk set up exclusively to sell it. It is worth remark, too, that the DB distributes free a gaily colour-illustrated 32-page primer on how to use and exploit its timetable.

The first essential at home is a BRB edict that the sanctity of a published timetable must be observed except in cases of otherwise insurmountable emergency. In view of the months that elapse between a closure proposal and approval for its fulfilment, as another correspondent observes this month, any additional losses incurred in prolonging a service until the next official timetable change must be proportionately insignificant; and these losses could be cut by intelligent and worthwhile improvisation. The same applies to changes in train make-up, such as the removal of unremunerative refreshment cars. There must be far less easy tolerance of second thoughts on margins at stations for connectional, parcels or GPO work. Everyone concerned, from the timetable planners to the operating staff involved, must be told flatly that they will stand or fall by the time intervals they agree when the timetable is drafted, and that it is better slightly to overestimate the required margin than the reverse. (To judge by what one sees in Western Germany, however, stricter station working discipline might see a lot more accomplished in most existing allowances.) The problems of switching allowances from section to section to cover progress of civil engineering exercises like long rail-welding on the West Coast main line are surely capable of resolution by comprehensive Traffic planning. One wonders whether the 2,000 h.p. Type 4s now virtually monopolising the West Coast express service could not suitably cover for the time being one or two secondary trunk route express services—for example, the North-and-West—and some largely freight diagrams worked by 2,750 h.p. Type 4s; the latter would have a reserve of power on existing basic West Coast point-to-point times that should enable them to cope with the shifting handicaps of heavy p.w. work.

Motive power reshuffles of this kind, of course, would involve the BRB in detailed timetable planning; and it is high time that a strong co-ordinating authority was exercised from this level, since between themselves no Region seems assured of getting early enough notice of its neighbours' intentions where they impinge on its own service—as witness the new WR emergency timetable. In any event, the BRB must soon accept that the concept of Regional timetables is

Concluded on page 167

# letters

## ARE BR FRUSTRATING THEIR YOUNG TALENT?

SIR,—The emphasis in your January issue was on the positive contemporary aspects of British rail. In contrast was yet another letter by a railwayman on the departure of young men from railway service. This serious problem is not receiving sufficient attention.

I worked on the railway in both Operating and Commercial departments. During this period I spent most of my spare time studying railway and transport matters. In addition, I spent a great deal of time outside working hours in signalboxes and visiting other railway installations in order to acquire practical experience and knowledge. I passed the written part of the Traffic Apprentice examination after less than six months' service and again two years later. In addition to various internal railway examinations, I also passed the first part of the Graduateship Examination of the Institute of Transport. Eventually I found myself doing routine clerical work which could have been done by a boy of 15.

From people I know and from your own correspondents it appears that there are many cases where keenness and enthusiasm for a job are being continually frustrated and men consequently leave BR. There are many more who would leave if they were younger or did not have family responsibilities. The management points to the Staff Suggestions scheme as offering opportunities for initiative, but the emphasis is on minor detail. A reasonable suggestion of mine took nearly a year before being put into practice experimentally (I could produce other examples). The young recruit soon realises that really worthwhile ideas would be best kept until he is in a position to put them into practice and obtain some credit for them himself.

If British Rail is presenting a new progressive outlook then the resignations and frustrations of keen young railwaymen must be seriously examined at all levels of management. I hope that the recent correspondence in MODERN RAILWAYS will lead to some positive steps to improve the situation.

Nottingham. Ex-Clerk

*(Full name and address supplied.)*

### The Western will be in the black this year

SIR,—G. Freeman Allen's interview with Mr. G. F. Fiennes in your January issue was very encouraging. In the past we have had occasion to congratulate Mr. Fiennes on his success with the Eastern Region. We shall look forward to a similar pleasure when his prophesy as to the Western Region is fulfilled.

I was particularly struck by his remark on coal depots, to the effect that he was not entirely satisfied that very large concentrations were the right thing. This appears to raise an important issue of basic principle, in that the use of the British railway wagon as a "bunker" has grown up with industry from the earliest beginnings and is so much a part of our industrial life that any attempt to change it is revolutionary. No harm will be done by attempting to draw up a balance sheet of gain and loss.

The advantage of the old system was the saving of four separate handlings of the coal, so that hand labour was reduced as much as possible in its passage from pit to fireplace. The disadvantages were a very large number of loose-linked unfitted wagons, resulting in the traditional British railway wagon, which could easily be moved round a yard by "pinching", and of which the brakes could be operated by a man standing on the ground. From the operating point of view many overtaking loops and long lengths of four track had to be provided so that expresses could overtake the 40 m.p.h. goods trains.

It is sound economics from the railway point of view that these should be replaced by high-speed fitted trains, enabling many of the tracks to be dispensed with, and that wagons should be held in yards for a minimum time, during which the coal must be unloaded and stacked. To offset this, we have accepted the principle of stacking at large depots. In some cases the coal stack occupies a large area and is 20ft high, thus necessitating elaborate depositing and grabbing gear which can travel and reach out over the required distance. It would be very instructive to learn whether in fact overall costs have been reduced and whether we have not exchanged one costly operation for another.

Although it is accepted that as much goods traffic as possible must be conveyed in fitted wagons, statements as to future intentions are disturbingly vague and it is not impossible that loose-linked unfitted wagons may still be built in the future and may constitute 50 per cent or more of the wagon fleet in 1970.

Hence there is a pressing need for some scheme that would combine the advantages of both systems. The use has been suggested of a large number of high-capacity containers, which would be conveyed on high-speed fitted flat wagons. The latter would make fast return trips, while the containers could be lifted, or slid, from the flats on to a platform. there to be unloaded, or the coal bagged under suitable demurrage charges and conditions. The reverse process would take place with the empty containers, and a similar procedure at the collieries.

A. W. T. DANIEL.
The Railway Development Association.

SIR,—It is deplorable that Mr. Fiennes can regard rail travel between Bristol and Birmingham as secondary to that between Bristol and London. Since rail fares are the same over the whole system the public have a right to expect the same standards on both main lines. We accept that the frequency cannot be the same.

Chippenham. B. PERRYMAN.

### British Rail: the new image

SIR,—Before Britain's railway system is swamped by a tidal wave of Rail Blue, may an impartial observer give a few warnings?

Mr. Haresnape's January article seemed too often to be based on the dangerous assumption that the railways' troubles can be cured by a new coat of "with-it" paint. Although older stations and other buildings can undergo a startling transformation when carefully redecorated (witness the present-day Paddington), with rolling-stock it is quite a different matter.

If the new coach livery is intended to achieve a "new" image, then the coaches themselves must be new—or at least pretty good imitations. The XP64 train, the Clacton electrics, the "Trans-Pennines" and other stock of similar distinction and vintage would all look fine in blue and grey, and would produce the desired effect on the public. But if you start painting up pre-nationalisation and early BR stock in the same way you will be fooling no one; the effect will be as comically pathetic as an elderly lady wearing Mod make-up.

"Compromise," said one of your captions, "will end in a confused image—half-modern, half-traditional." But inappropriate use of the new colours will simply encourage the public to think that BR is making a desperate attempt to regain traffic by playing with paintpots at the taxpayer's expense—which is hardly the required result.

If we are going to have a modern coach livery—and it is obvious that we must—then restrict it to the more modern stock, and get rid of—or at least extensively rebuild—the older stuff as quickly as possible. When a modern external colour-scheme is cancelled out by a dingy, outmoded interior, then that is so much paint and money wasted.

Leamington Spa. M. J. LEAH.

SIR,—It will be entertaining to watch the reactions of any Continental visitors arriving at Liverpool Street and confronting that "Way Out" notice illustrated on page 34 of your January issue. I'll wager half of them will go this way or that way as directed by the arrows of the British Rail symbol, not straight ahead.

Exeter. G. M. NEWMAN.

SIR,—So dropping the last syllable from British Railways, in your view, "achieves a name no more relevant to the organisation" and invites "a prejudiced and unjustified reaction to the whole scheme as piece of designers' preciosity". Do you really think that British European Airways is a more meaningful and compelling title for this day and age than Air France, Swissair and Aer Lingus?

Brighton. R. C. GRAYSON.

SIR,—At last a unified design, a first-class pack for a first-class product—the secret of sales to the public!

Reading your "British Rail" article before any other in the January issue I was enthusiastic. But then I saw your photograph of the new Southern Region's 4-BIG and 4-CIG express units. What was this box-like cab-end —1930 or 1940 design vintage? It looks plain and ugly. I doubt whether this piece of "traditional Southern" was ever seen by the

Design Research Unit or the Design Panel.

The Glasgow "Blue Trains" and the "Trans-Pennine" are good examples of clean design. Surely what can be done for other Regions can be done by or for the Southern.

Boston. R. PILBEAM.

SIR,—Brian Haresnape says, in a tone of regret, that hitherto no overall house colour scheme has been achieved. The British Rail scheme will have the effect of making the powers behind the railways even more remote from the man in the street than they are at the moment. Would it not be better if more rather than less emphasis was placed on the status of the individual Regions, as this would make the management of each sector of the system seem more like human beings who know that sector and its problems? It would be an improvement if other Regions were to copy the Southern's excellent idea of trying to create a corporate identity within the Region.

The present-day liveries are very unsatisfactory and the proposed new one is certainly a great advance. But rather than apply the same blue and grey to all passenger stock, it would be better to devise a Regional colour scheme to go with the proposed grey window panels. In most cases the existing colours are suitable, but the North Eastern Region's orange ought to be amalgamated with the Eastern's dark blue. A locomotive livery is more difficult to select as a colour which blends with all five Regional colours is needed. Black, lined out as the LNWR did, should be suitable. The yellow warning panel would be integrated into the design instead of looking like an afterthought, as it does with the present livery. Goods stock could stay the same colour, with one main exception. This is the passenger vans, which would have to be repainted in either a dark grey, or, if they were confined to one Region or one train set, in the Regional passenger livery. Ships would be repainted in the livery proposed for them, except that the funnels would be in the Regional colour.

Walton-on-Thames. JAMES B. DUNCAN.

SIR,—I see that platform tickets are to cost 3d. I see too from Brian Haresnape's article that the first appearance of the British Rail logotype and symbol is in printed matter. Perhaps now we shall have to complete, in quadruplicate, an elaborate Application Form for the Priceless Privilege of Permission to Purchase a Platform Ticket, at least three clear working days' notice to be given.

This cynical remark is prompted by your illustration of Tamworth station and an unfortunate experience I had there late last summer. Travelling by road from the Peak District to the South Coast, we decided on a ten-minute break at Tamworth, where I was very favourably impressed with the modern, dignified station buildings. Not readily seeing a platform ticket machine, I asked the ticket collector if he could oblige me with one. He declined and enquired why I wanted one. I still didn't smell a rat and cheerfully explained that we were just passing through and wanted to have a quick look round his wonderful new station. His firm refusal showed that he was acting on higher instructions, so I asked to see the Stationmaster. I found him courteous, but harsh and unsympathetic. He too claimed to be acting on higher instructions ("You can write to Mr. So-and-So if you like") and drew my attention to a notice in the entrance hall to the effect that train-spotters were not allowed on the platforms. My suggestion that I was just an ordinary responsible citizen did not help; nor was I able to discover any real reason why I was being refused access to the platform. I remained calm and polite, and assured him that I had no intention of wrecking anything. But no. "Private property", "trespassing" and so on. Reluctantly I gave up and retreated to my car.

Is this a foretaste of the new public image of British Rail? Modern station buildings, but with access to platforms restricted to those meeting passengers arriving by train? At Southampton, visitors can cruise round the docks and even by prior arrangement be shown over a "Queen" liner; at London Airport someone has gone to a tremendous amount of trouble to provide outstanding spectator facilities. In both cases the non-passenger is made welcome; at Tamworth I was made to feel far from welcome.

The impact of the corporate identity programme of British Rail will be lessened if the non-passenger is treated as a nuisance, only to be tolerated if he can produce a good enough excuse for his presence. After all, today's non-passenger may well be tomorrow's passenger.

Stonehouse. E. A. HARLE.

[*The Divisional Manager, Stoke, LMR, BR writes:* "Our Stationmaster and his staff at that station have been under continuous pressure from train-spotters ever since we banned their presence there. This we had to do because of unruly behaviour which inconvenienced our passengers and staff and introduced an element of danger. Both adults and children have adopted almost every possible subterfuge to circumvent the ban and this has not made things any easier for the station staff.

This is the reason for the present regulation that the issue of platform tickets is confined to persons accompanying passengers joining trains or meeting passengers alighting at Tamworth. I have, however, instructed the Stationmaster to make exceptions to this rule in a case such as that described by Mr. Harle and he will, in fact, show people the station himself whenever possible."]

## The revised Western timetable

SIR,—Let us welcome the reappearance of the Western Region timetable in coherent form, but it is a pity that its neighbours were not associated with this project.

No later than its commencement date the whole of the information in Table 29 had been nullified by the Southern Region's dieselisation of the Reading–Tonbridge trains, with the introduction of a completely new timetable.

Similarly, the West-to-North service (Table 10) had been affected by the considerable decelerations made by the LM and Scottish Regions north of Crewe simultaneously with the completion of electrification to Rugby.

The times given in the WR book for stations from Warrington northwards are in fact a mixture of the old and new schedules plus some timings which do not seem to correspond to either. The columns starting with the 08.14 from Carlisle and the 10.05 from Glasgow respectively are particularly unreliable, but one cannot blame Paddington too harshly for failing to keep up to date with the morning Carlisle–Euston train, which has had four successive different published timings since the start of the current winter timetable.

As for the future of these cross-country services, is there a Freudian slip revealing the shape of things to come on page 32 of the WR book, where a column note shows a through omnibus from Manchester to Penzance?

Surbiton. J. N. FAULKNER.

## What Customs cost BR

SIR,—Attention must be called to the inaccurate and misleading statements in an editorial of your January issue. Birmingham Aston is not the first inland centre for customs clearance of rail freight traffic. Secondly, for many years traffic for London arriving at the packet ports has been cleared at Bishopsgate, Bricklayers Arms and Hither Green; since the calamitous fire at Bishopsgate this concession has been extended to various stations in the London area to deal with goods arriving via Harwich, as an interim measure. British Rail are now studying with us the creation of similar facilities at Manchester and, possibly later, Birmingham. On the export side facilities have existed for some time for the clearance and despatch of goods in containerised loads from the London stations, Manchester and, more recently, Birmingham and, contrary to what might be inferred from your comment, British Rail and H.M. Customs are working amicably in this and most other matters.

Your sallies about punctiliousness on matters of security and documentation are ill-merited. We find incomprehensible your suggestions that it is right for every other Customs to seal the wagons but wrong for the UK Customs to do so and that we compel unnecessary documentation. You say without substantiation that "the whole quayside routine keeps the ferry wagon throughput of one British Railways port at least running at about a third of its potential and seriously restricts utilisation of these expensive specialised vehicles". If the wagons are to be cleared by the Customs at the port of arrival the importer must prepare the documents, arrange for the duty to be paid (all of which, if the necessary papers are available, can be done before the goods arrive) and arrange for the goods to be available for examination by the Customs if so required; once this has been done the movement of the goods is in no way retarded by the Customs. Where the wagons are cleared by the Customs elsewhere than at the port of arrival all these formalities are deferred until the goods reach the inland centre, and then throughput is dependent only upon railway operational factors.

As to the cost of the installations of a transport operator, naturally these should be borne by him alone. Our requirements are dovetailed into such installations, the main ones being an office for the Customs Officer and a segregated space in which goods can be examined. The cost of these will vary and is governed by layout and physical conditions but will be marginal in relation to the whole capital outlay.

You also mentioned the examination of passengers' baggage in boat trains. This idea has never been approved in principle and it has yet to be proved that it is more convenient for the passengers if the work is to be carried out effectively.

A. J. FILLMORE.
*Press & Information Officer.*
HM Customs & Excise,
London, EC3.

## The Euston outer suburban service

SIR,—I have even seen foreign businessmen using the London–Northampton motorway coaches (*January issue*), probably more for speed than cheapness. But British long-distance coach fares are the lowest in Europe, probably because we do not deliberately use them to subsidise local services in the way the railways do. If through coach fares were fixed at the sum of the local bus fares along the same route, the companies would have a good surplus from which to maintain the local routes whose existence is threatened.

London, S.E.19. J. H. PRICE.

## The Reading–Tonbridge line

SIR,—The editorial "Strong case for a new image" in your January issue contains some disturbingly accurate observations. An example of the traditional, steam-age image of

British Railways being perpetuated concerns the modernisation programme for the Tonbridge–Reading line.

The publicity hand-out sticks to the previous tradition of not specifying which trains run through between Tonbridge and Reading, so that at least one detail of modernisation remains a secret. Second, trains still call at all stations, and any passengers wanting to travel on to the WR or South Coast are subjected to the usual cross-country crawl. Third, the wayside stations which must contribute heavily to the losses incurred enjoy an hourly service at the expense of inter-urban passengers. The fact that it is marginally quicker to use this line than to travel to Guildford or Oxford from Tonbridge, for example, via London will not encourage new patronage. People will simply travel by road. Even if they did use the ex-SER line, the timetable would be pretty ineffective since it gives no through connections to the coast or West Midlands. Fourth (and this summary of grievances is not exhaustive) the stations remain as drab as ever, especially Reading Southern and Dorking Town.

There have, I admit, been some improvements such as the provision of a regular-interval service throughout the day, an average reduction of journey times to the order of 10 per cent and the introduction of d.m.us; but these alone won't increase patronage to the extent of making the line profitable—one thinks in this respect of the Oxford–Cambridge line which bears some resemblance to this line. One new approach, I think, should be the running of trains between Tonbridge and Reading calling at sav, Redhill, Deepdene and Guildford only, which would make good main-line connections at each end, coupled with the conductor-guard system working on a reduced stopping service. The fact that the line connects most of the main lines of the South-East with the WR without the complications of travelling via London is its great, and as far as I can see, only virtue.

Tonbridge. D. P. C. LEEFE.

## GE Line performance

SIR,—If I may be permitted to comment on Cecil J. Allen's notes on Great Eastern Line performance in your January issue, one of the reasons for delays at Shenfield is that this most important and busy interchange junction still has an old-fashioned manual signalbox, with some quite long runs of point rodding. The consequent heavy pulls mean that once a route has been set up it is often necessary to delay a main-line train to await a crossing local service which is a minute or two late rather than accept the former first. This is surely a case for urgent modernisation, as suburban services also suffer delays if schedules are not exactly met. Turning to the Clacton electric stock, on Sundays, when permanent way delays are frequent, a formation of one four-car buffet set and two twins is often used. i.e. 3,384 h.p. for some 360 tons, or 9.4 h.p. per ton of trains! Recovery can be remarkable. Between Chelmsford and Shenfield, 10-car electrics often achieve from 7½ to 8min for the 9 miles 46 chains, and in the reverse direction, English Electric Type 3 diesels with a light load of six coaches are capable of 8min start to stop.

Shenfield. JOHN RODGERS.

## Power signalling at Guildford

SIR,—May I comment on your article "Power Signalling for Guildford" (*January issue*)?

First, the box at Ash will not control "automatic" barriers; they will be "controlled" barriers. Automatic barriers are those worked by track circuit operation alone without the aid of a signalman.

Second, the great advantage of the plug-in geographical units is not rapid changing under failure conditions. This is a fringe benefit and very rarely happens anyway. The benefit is that the vital interlocking circuits are pre-wired in the factory and tested there by an automatic routine tester. The units are delivered to the site sealed, and this seal is never undone. They are guaranteed correct by the contractor and this cuts out a lot of tedious testing during installation. The sets are interconnected by cables instead of single wires, which also simplifies testing and reduces installation time.

The Guildford scheme is not, as you suggest, incorporated in the signalling programme for the Bournemouth electrification either geographically or financially. It is purely a maintenance scheme, i.e. the replacement of life-expired equipment; and it is always sound economics to replace it in the most modern form.

Finally the scheme will not be in operation by Easter, 1965, but by Easter, 1966. The job will be brought in in several stages, the first of which is from Effingham Junction to London Road in July 1965; the second, the area south of Chalk Tunnel, in October 1965; and finally, the Ash line in early 1966. The power box will be commissioned soon after though these dates are not fixed finally yet.

CS & TE, SR Q. J. A. MACDONALD,
Wimbledon BR *Technical Assistant.*

## Who wants more speed?

SIR,—May I be permitted a rejoinder to Norman A. S. Moyes in your January issue? My original letter in November made no criticism of any suggestion that speeds be increased on suburban or cross-country services: indeed, I specifically suggested that it was on services of this sort that an effort should be made to shorten journey times by increased speeds and improved connections.

My point was that too much is being made of accelerations of a few very high-speed trains, whilst the "bread-and-butter" trains are being allowed to decline further and further towards the point of total unattractiveness and uselessness. Recently I travelled from Windermere to Swinton, a distance of 115¾ miles: this took 5hr 40min, making an average speed of almost exactly 20 m.p.h. That included 2hr 6min waiting for connections at two changing points. Clearly this was a journey which could not begin to compare with car travel for speed or convenience—nor for comfort, as almost all the rolling stock on the trains used was elderly and ill-cared-for. Yet this is the sort of journey for which neither road nor air services can compete; and far more people make journeys between termini of this sort every day than travel between London and Edinburgh or Bristol.

I still maintain that there is quite widespread dislike of the extremely high speeds now being run, with indifferent rolling stock, on some main lines. I have had further evidence of this since my original letter was written. A professional man of my acquaintance told me he had had occasion to travel from Doncaster to London and back and decided to leave his car at home and go by train—for the first time for many years. He complained bitterly of the oscillation, which he attributed to excessive speed throughout the journey and which he said was bad enough to make reading impossible. I do not think he will willingly repeat the experiment.

Swinton. P. H. ENGLISH.

## Why do economies have to wait until closure?

SIR,—With increasing regularity a concrete case is made out for the closure of a branch railway line. Then, after permission is given by the Minister of Transport to this end, the matter pends for a considerable time until the replacement buses, etc., have been organised. The line is eventually closed with a minimum of notice, and that only along the line itself. The dates finally chosen do not always coincide even with the end of a timetable validity period, so that often there appears no reason why the threat of closure should be raised such a long time before the closure is actually executed. If the lines do in fact lose the amounts of money stated, then surely efforts should be made to effect economy in the interim before closure?

A particular instance which I am acquainted with is the Manchester–Leigh–Liverpool service. I would say that at no station on the line does traffic warrant a booking clerk, even at the peak periods. At Worsley, for example, the number of passengers booked in either of the two shifts per day often can be counted on one hand. Meanwhile, the station is staffed from about 6.00 to 23.00.

Considerable vandalism has reduced the facilities of the station (tnere are about two break-ins each month) and although to date it still has running cold water, there are no toilets and the unfortunate clerk has to visit the woods or walk to the nearest public house (nearly a mile), always assuming that the timetable permits. Recently the local public health inspector said he would require a toilet to be fitted (at more expense).

Would it not be much wiser to un-staff such stations and save money, even for a short period? On this particular service there is very little parcels traffic for the guard to deal with and he could quite easily cope with fare collection. Use of a second-hand bus-ticket issuing machine would involve a first cost of under £5.

Swindon. G. WHEAT.

## The Glasgow–Edinburgh service

SIR,—If the "gilt is off the gingerbread" of the Edinburgh–Glasgow diesel services this is not necessarily because the journey times are not fast enough. It could well be because the diesel multiple-units used are so uncomfortable. Second-class travel in these trains is a jolting, jarring, over-heated purgatory—as, of course, it is on most of the diesel multiple-units. Indeed, I cannot help wondering how many passengers have been lost to British Railways as a result of their introduction. When they are first introduced to a line the service is usually improved (temporarily, at least) and a number of new passengers are attracted by the novelty. These, however, soon depart in disillusionment—and with them go many of the "old regular" passengers who cannot put up with the new discomforts. Why cannot they build smooth-riding coaches these days? Even the Glasgow electrics seem too light and highly sprung, and jolt and sway about all over the place. I am sure it is only their phenomenal frequency which makes them so popular.

Edinburgh 9. P. D. HANCOCK.

SIR,—One of your correspondents alleges that the "gilt is off the gingerbread" with regard to the Edinburgh–Glasgow services. What does this mean—presumably that receipts are not falling, but fail to increase? I work with a large organisation and occasionally we visit Edinburgh on business. We all use the train, and as far as I can ascertain we are all satisfied with the service. It is a pleasant hour's relaxation and I for one am not interested in cutting 15min off the journey time, especially if it entails a rougher ride.

If Scottish Region want something to do, they should turn their attention to speeding up some of the m.u. diesels running to steam

**Concluded on page 139**

# FRENCH RAILWAYS CARRY OUT MORE 150 m.p.h. TRIALS

Sister locomotives of two of the participants in the recent SNCF high speed trials.

**Above:** 5,500 h.p. No. BB-9262 at the head of the northbound "Sud Express" at Hendaye, with RENFE 2Co-Co2 No. 7201 on the right at the head of the Spanish "Sud Express" from Madrid and Lisbon, on June 28, 1962. *Photo by C. P. Boocock*
**Right:** Four-voltage No. CC-40103 on an Amsterdam–Paris express at Aulnoye on October 19, 1964; on the right is one of the early SNCF 25kV a.c. locomotives, No. BB-13038. *Photo by P. J. Lynch*

EVER since electric locomotives CC-7107 and BB-9004 achieved the world's railway speed record with 205.6 m.p.h. hauling three-coach test trains between Facture and Morcenx, on the SW Region's Bordeaux–Hendaye line (electrified at 1,500V d.c.), on March 28 and 29 respectively, 1955, the SNCF has been studying the possibilities of a higher level of train speeds compatible with the costs of additional signalling and other safety devices and civil engineering works, such as easing of curves, strengthening of underline bridges and relaying with heavier track. Without any very extensive new works it has been possible to raise the speed limit on many sections to 87 m.p.h. (140 km.p.h.) and in some cases to 93 m.p.h. (150 km.p.h.).

To obtain information on the behaviour of rolling stock, track and overhead electrical equipment at higher speeds and the measures necessary to ensure safety, a fresh series of tests was conducted in the South-West between December 9, 1963, and June 19, 1964, on the Bordeaux–Morcenx main line in the flat region of the Landes on the up track of the double line between Solférino and Caudos, approximately 60 and 32 miles respectively south of Bordeaux. The series were held on (a) December 9–16, (b) January 10 to March 6 and (c) April 27 to June 19. Series (a) and (b) were conducted solely with 5,500 h.p. express passenger locomotive BB-9291, and (c) partly with 3,000 h.p. mixed-traffic locomotive BB-9531. Our contemporary *La Vie du Rail* has given details on which this account is based.

Between Solférino and Caudos a 15-mile section of the up track was specially prepared. The track consists of U36 type, 92 lb. rails, not welded, 59ft long, affixed to metal baseplates on timber sleepers. The overhead electrical equipment on the Bordeaux–Morcenx section is of the type installed by the C. de F.du Midi when it electrified the line in 1926–27. For high-speed test purposes it was replaced in 1962 over some 12 miles of track by specially strengthened standard SNCF catenary, and in the following year Midi type catenary on a further 3 miles of track was modified to improve current collection at speed. Because of the small demands on current made by the light test train, the current distribution network was not modified in any way. During test runs, no passenger or freight trains were allowed to pass the test train on the other track. At the 31 level crossings circuit breakers were installed to shut off the current supply in case of danger. Where animals were thought likely to stray on to the track, the SNCF erected electric fencing. The public were not allowed on the platforms of any station on the test length, and powered and hand trolleys etc. were cleared from platforms. At Ychoux station, about half-way between Solférino and Caudos, an RT transmitter and receiver set was installed as a link with a similar set on locomotive BB-9291. Before and after each test, the locomotive and test train vehicles were examined on the inspection pits at Bordeaux. Before taking possession of the track before each test, and immediately afterwards, before relinquishing possession, the testing staff examined in detail all track and overhead equipment subjected to special strains or pressures by speeds of over 93 m.p.h.

Information sought included temperature changes of locomotive and coach bogie axleboxes; metal fatigue in rails, baseplates, screws etc.; air pressures on windows of vehicles passing trains on the other track at speed; and braking. As distinct from other BB-9200 class locomotives, No. 9291 had special features: "monobloc" wheels; Timken roller-bearing axleboxes; gear ratio specially increased from 1·777:1 to 1·1:1 so as to facilitate a maximum speed of 155 m.p.h. (250 km.p.h.); use of class H insulation slightly to increase the power of the motors, from 5,500 to 5,940 h.p. (1hr rating) and to 6,250 h.p. for a space of 20min; Sécheron flange lubricators; a device to reduce by atomisation the effect of water on the rail; and rheostatic brakes.

Besides the usual speed test equipment and the RT set, No. 9291 was fitted with a TV camera on the roof, viewing the rear pantograph, also with wire mesh grids to protect the windows.

## 68 runs at 125 m.p.h. plus

The five coaches used were B10 (10-compartment 2nd-class side-corridor) fitted with Y24A type bogies. Only three or four were used for each test run. The leading vehicle carried the recording instruments and the TV screen showing the behaviour of the pantograph. Of 99 test runs in these two series, 155 m.p.h. was achieved during 11 runs, 149 m.p.h. on two and 125 m.p.h. (200 km.p.h.) on 68 runs.

The tests, which included an ingenious use of strain gauges in measuring sidethrusts and hunting, showed the locomotive's stability even at 155 m.p.h., and at 112 m.p.h. when rounding the curve of 150ch radius near Labouheyre. The coaches also ran smoothly. The steady running of the last coach in the rake of three or four, and after some 72,000 miles of running

including many at high speed, is attributed mainly to the design and maintenance of the Y24 bogie. The type G pantograph also behaved well. No diminution in the current was perceptible when the test train, travelling at 155 m.p.h., passed a train running at 100 m.p.h. on the down track. Axleboxes on the locomotive and the leading bogie of the leading coach showed no signs of overheating despite ambient temperatures of up to 87 deg. F.

## Trains pass at 255 m.p.h.

The effects on the glass windows of trains passing at high speed were assessed. The test train coach windows were double-glazed with "guillotine" windows, with lights divided horizontally. The train in the opposite direction was comprised of various types of stock with balanced drop-lights. At a combined speed at passing of 255 m.p.h. (test train 155 m.p.h., crossing train 100 m.p.h.), the glass panes were deflected within moderate limits and showed no tendency to fracture. The SNCF points out, however, that the trains passed at a point where the surroundings are quite flat; in a cutting, air pressure would have exercised a greater strain on the glass. Braking tests were insufficiently prolonged to allow of definite conclusions; they are to feature in future high-speed trials.

## 125 m.p.h. with mixed traffic type

No. BB-9531 is equipped with two gears. Test runs were made on May 28 and June 2 and 3 at up to 125 m.p.h., hauling three corridor coaches. Labouheyre curve was likewise negotiated at 112 m.p.h. The tests showed the locomotive to be stable at high speeds, despite its short wheelbase, less by 6ft than that of the BB-9200 class.

No. CC-40101, prototype of the four-voltage locomotives described in the August, 1964 issue, was the subject of speed trials on June 22–30 on the up track between St. Quentin and Creil, 64 miles, on the Northern Region's Paris–Aulnoye–Brussels main line electrified at 25 kV a.c. The bow of the special pantograph was shaped to present a considerably reduced wind resistance, and this was apparent at speeds of over 130 m.p.h. Protective grids were fitted over the windows. Otherwise, the tests were similar to those in the SW Region.

The test train was made up on the first two days of the dynamometer car followed by four vehicles of the types running in the Paris–Brussels–Amsterdam TEEs. Later, the dynamometer car was replaced by the leading bogie vehicle used in the SW Region tests. The load on all runs was about 250 tons.

Special arrangements included speed restrictions on certain sharper curves and temporary lineside signs indicating the beginning and end of speed-restricted sections, maximum speeds allowed for test purposes, and points at which current must be shut off. All level crossings were closed to road traffic 8min before the scheduled passing time of the test train and for 15min after it had passed; if the test train was 12min or more behind schedule, it was allowed to run only at the speeds normally permitted over the line. During high-speed tests no other train was allowed to pass on the down line.

## 95 miles at 95 m.p.h. average

On June 22 and 23 tests of current supply at 100 and 105 m.p.h. were made on a 15-mile section. On June 25, 26 and 29 the behaviour was examined of the first and third axles of the leading bogie of the locomotive, and various routine dynamometer car recordings were made. June 30 saw attainment of 138 m.p.h. From St. Quentin No. CC-40101 accelerated from start to 125 m.p.h. at an average acceleration rate of 0.8ft per sec$^2$. At 112 m.p.h. it was developing 8,700 h.p. The 63.4 miles from St. Quentin to Creil were covered at an average of 102.5 m.p.h. and the 95.1 miles to Paris at an average of 95.7 m.p.h. Tests showed the locomotive to ride well at high speeds, including 106 m.p.h. on curves, especially as regards lateral movements of the third axle. No trouble whatever was reported with the catenaries or pantograph.

Further tests are being held between Bordeaux and Morcenx with a view to acceleration on the SW Region d.c. electrified lines. No particularly high speeds are envisaged on dieselised main lines. The SNCF management recently emphasised the importance of safety tests of equipment before widespread introduction of very high speeds, and its programme of accelerations is not, apparently, as ambitious as that of the German Federal.

# THE ITALIANS GET READY FOR 112 m.p.h. INTER-CITY RUNNING

**P. M. Kalla-Bishop**

THE 32¼ miles between Campoleone and Priverno stations on the Rome to Naples *direttissima* are to be equipped with a modified catenary system suitable for electric train speeds of 85 to 145 m.p.h. The work is a continuation of trials and preparations that have been going on for the last two or three years to provide for a normal maximum speed of 112 m.p.h. on main lines between Italy's important cities.

There are now in traffic 20 of the ALe601 class multiple-unit motor-coaches, together with the necessary trailers, capable of this maximum speed. Shortly, the first of the E444 class Bo-Bo locomotives will appear; this will be an entirely new design with the same maximum speed. Trials were run in 1962 and 1963 in the vicinity of Grosseto with motor-coach No. ALe601.018, during which top speeds of 132 m.p.h. and 140 m.p.h. were obtained. These were to test the bogie suspension and the new Type 52 pantograph, and to observe catenary behaviour under the stresses of high speed. Both bogie and pantograph were considered satisfactory. The pantograph has an arched copper contact strip to guard against wear as compared with the level carbon surface of the widely-used Type 42 pantograph, the preceding design.

The FS now think it desirable to prepare a substantial length of modified catenary for full evaluation. A simple catenary has hitherto been standard on the 3,000V d.c. railways of the FS. On the main lines the catenary cable is of 120mm$^2$ section, supporting a double contact line, in which each wire is of 100mm$^2$ section. The contact line is under tension supplied by weights hung on selected mast supports.

At speeds of over 100 m.p.h. it was found that the contact line of this standard catenary was thrown upwards beyond desirable limits by the passage of the pantograph. Contributing to this upward movement was the upward thrust of the pantograph, the increase of friction between the contact strip and contact line and an accentuation of the continuous deformation of the contact wire round the top of the pantograph in motion. It was further observed that as the speed increased up to 125 m.p.h. the height to which the contact line rose increased only slightly, but that there was a notable increase of stress on the catenary cable supporting insulators and the support masts.

Modifications have been made therefore to the standard catenary to counteract these effects of high speed. The tension on the contact wire has been increased by one-third, to about 2,000 lb., which has been found to have the effect of roughly halving the upward movement. Droppers from the catenary cable, carrying the contact line near the catenary cable supporting insulators, have been given some elasticity, to increase the suppleness of the contact line. Finally, automatic compensation for ambient temperature effects on the catenary cable has been provided, in order to ensure that the condition of the catenary remains as constant as possible.

# Railway signalling and safety devices of the future

*The former Chief Inspecting Officer (Railways) of the Ministry of Transport previews important new developments—tokenless block working trials in Scotland and possibly automatic crossing arrangements; a new standard diesel locomotive cab layout; and new prospects for radio and radar control of trains. He was talking to the Berks, Bucks and Oxon section of the Institute of Transport and this is a condensed version of his paper*

**Brig. C. A. LANGLEY, CB., CBE., MC.**

THE British Railways plan for the future provides for redundant lines and stations to be closed, and traffic in general to be concentrated on a number of high-speed routes. The slow stopping passenger train will no longer obstruct the main lines and slow freights will be confined as far as possible to independent routes. A number of feeder lines will also be necessary, as well as branches with self-contained services which are justified by the traffic they carry or which have to be retained to meet the real needs of the communities they serve.

Under such a policy much simplification of signalling should be possible. The closure of intermediate stations and sidings and the elimination of the stopping passenger and pick-up goods trains should result in the removal of large numbers of points and signals, and the control of signalling from a few widely spaced boxes at main stations. The intermediate signals will be worked automatically by track circuit occupation or other means, to maintain an adequate space-interval between trains. AWS will be extended to cover all main routes and we shall see trains running at high average speeds with maxima of about 100 m.p.h.—or possibly a little more.

All this is an extension of existing signalling safeguards. With the segregation of traffic the prospects of more sophisticated forms of operation and control are promising, while on the lightly-used lines simpler systems of signalling may be introduced. But before casting horoscopes about the future, let us see what immediate developments are likely.

The latest major work is the new power signalbox at Rugby (*described in last month's issue*). One of the major problems the operator has to face with modern signalling is the disruption caused when anything fails to function. At Rugby, as at other installations on the LMR, special steps have been taken to reduce train delays caused by failure of power signalling equipment. These include the duplication of power supplies and important items of equipment, overriding controls on the electronic remote control gear, rapid means of replacing defective relays, etc., loudspeakers to advise maintenance staff, and detector and track circuit switches to enable points and signals still to be operated, subject to rigid safeguards, when the respective safety devices break down from any cause.

## A track short-circuiting device

Increased speeds and denser traffic may increase the risk of accidents from a derailment on an adjoining line because the time available for protecting the resulting obstruction may be reduced. On fully track-circuited lines the derailed vehicles will usually short-circuit the tracks and thereby cause the signals to return to danger, thus giving warning of the obstruction to approaching trains. Cases do arise, however, when an adjoining line is obstructed without the track being short-circuited. In order to help train crews to give immediate protection, a simple track short-circuiting device has been produced which can be clamped to the rails very quickly. The device should afford rapid protection to an obstruction on a track-circuited section of the line, but it will not take the place or reduce the need for carrying out the protective measures laid down in the Rules.

On high-speed lines AWS or some other form of cab signalling, continuous track circuiting with automatic and semi-automatic colour-lights, and power signalling are needed. On lightly-used lines simpler forms of signalling and train control will suffice.

## Tokenless block tests in Scotland

For example, the latest development in single-line working on British Railways is the Tokenless Block system, which will shortly be tested in Scotland. Under this system, the exchange of tokens will be abolished without sacrifice of safety and the movement of trains will be controlled by conventional signalling. Block instruments will be used for passing messages between boxes and for obtaining the release of starting signals. The controls have been designed to prevent a train from being allowed into an occupied section by ensuring that a train in section has occupied and cleared a track circuit at the far end of the section before authority for another movement can be given. The direction of traffic flow cannot be changed until the section is proved unoccupied and the controls normal.

This system will enable signalboxes to be switched out easily during slack periods, and allow for travelling signalmen to open boxes for limited periods in order to deal with particular traffic movements. The delays resulting from the exchange of tokens will be avoided and the average speed on the line substantially increased, whilst it should be possible to make substantial reductions in operating staff.

With this system the signalman will still have to see that a train has passed complete with tail-lamp before accepting another, but the introduction of tail magnets, such as are being used in some countries, should make it possible to run convoys of trains in one direction past unmanned block posts. Inductors will be needed to pick up signals from the tail magnet before a clearance can be given, thus ensuring that the train has passed through the section complete before another can be accepted.

## Trains may operate crossing points

The next stage in development may well be the crossing of trains at unmanned stations with the points and signals operated by the trains themselves. Experiments have shown that this is practicable either by using normal power-operated point machines and point locks, or self-acting spring-operated points with ground track locks, but in the latter case a speed limit of 10 m.p.h. will have to be imposed in the facing direction. The points and signals would be controlled by the occupation and clearance of track circuits; inductors would check that the train had arrived complete with tail magnet, and the occupation and clearance of track circuits could also be used to obtain authority for the movement into the section ahead. I believe that such a scheme could be made safe, practicable, and relatively cheap compared with an elaborate CTC system with complete track circuiting and remote control of points and signals from a central cabin.

## New BR diesel cab layout

Last year, in order to get first-hand knowledge of the subject, I made an intensive study of a driver's work in charge

of all types of diesel and electric locomotive. I travelled long distances by day and by night in the cabs of various classes of locomotive, hauling different types of load from high-speed passenger expresses to Class 9 freight trains.

Then I called in ergonomic and medical experts to help me and as a result a mock-up of a diesel cab has been built at Derby and accepted as a basis for future locomotive design. Some of its features are: a clear view ahead, but with the window ledge high enough to save the driver from "sleeper flicker"; robust windscreen wipers, washers, and sun visors; standardised position of the power and brake controls; and gauges and instruments of ample size and clearly marked with the minimum of minor scale markings (these are so placed that they are close to the controls with which they are associated). The speedometer, which is the most important instrument in the cab, has been made larger than the others and placed in the most prominent position, with an electric clock mounted above it. The AWS indicator and re-set button have been placed on the left-hand window stanchion at eye level so as to associate it with the observation of signals.

Special attention has also been paid to the siting of fault lights and indicators, sanders, horn button, etc., so as to ensure that those most needed by the driver are the most readily accessible. The driver's tip-up seat is well padded and adjustable. It is armless to provide easy access and the cab floor has been kept clear and on one level so that a driver can move about easily. A screen behind the seat helps to reduce draughts.

Heating and ventilation problems are still being studied. A series of tests is going to be carried out on existing locomotives to see how conditions can be improved.

## DSD, AWS and cab signalling

The first safety requirement nowadays is a suitable Driver's Safety Device (DSD), once known as the "deadman's pedal", to ensure that he is alerted should he get drowsy and that the train is stopped should he fail to respond to the warning (*see the January issue*). I would draw your attention to the name, which I introduced early last year. The title "Driver's Safety Device" was chosen so as to remove the suggestion implicit in the old name (deadman's pedal) that it was a safeguard only against the remote contingency of a driver dying at the controls. The new name properly indicates that the device is there to assist the driver at all times and under all conditions.

Another factor is the increased strain on the driver, resulting from higher speeds, because the time available for him to observe signals is reduced and the distance needed for braking is increased. Hence much thought has been given to devising means of reinforcing a driver's vigilance of signals and to curtailing his speed should he fail to respond to their warning.

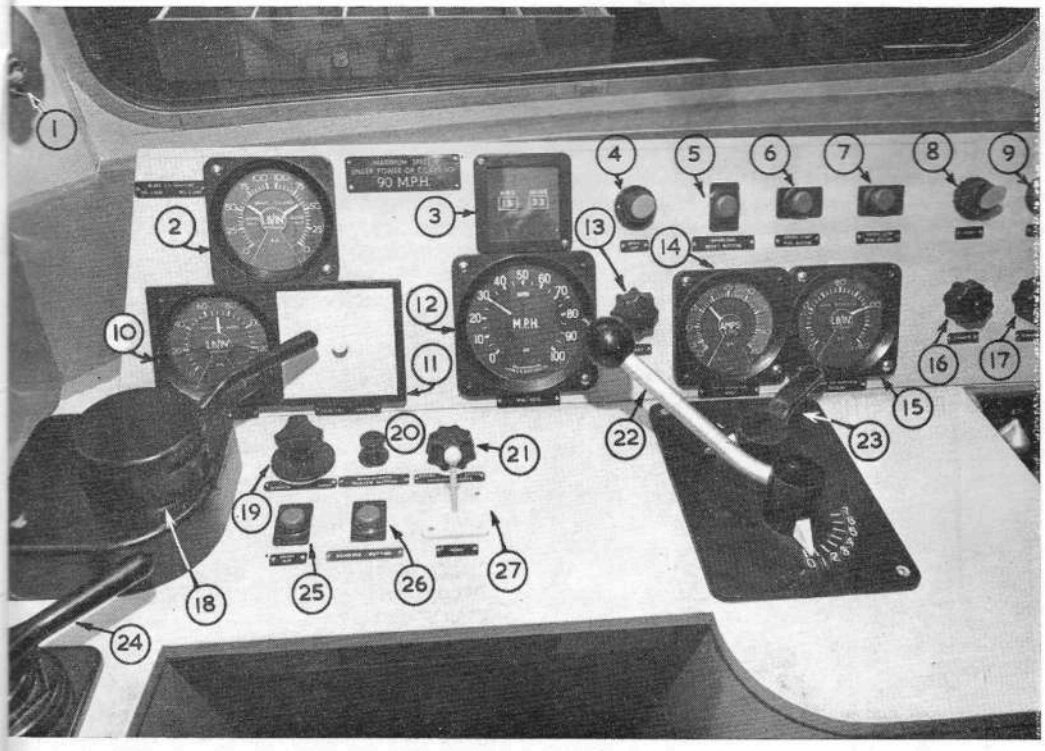
On British Railways the simple Automatic Warning System has been adopted. Other more positive systems can be used, such as the train stop control system of London Transport. On these lines a trip lever is mounted close to the rail alongside every stop signal. This opens the cock in the train pipe and applies the brakes with full force should the train pass the signal at danger. Signals are so spaced that a train overrunning one at danger will be stopped clear of any train ahead. This system is not suitable for main-line operation because braking distances vary with the speed and the type of traffic; also, trip levers and cocks are liable to damage when striking each other at high speed.

Cab signalling is another more complicated development, whereby not only is the driver warned of the aspect of the signal ahead by its repetition in miniature in the cab, but the speed of the train is automatically controlled and it is eventually stopped should the driver fail to respond correctly to the signal warnings.

## Automatic trains may still need drivers

Finally, on some high-speed lines and on lines with dense traffic, complete automatic operation is being introduced. For example, London Transport Railways have recently brought into use a system that relies on currents, either coded or of different frequency, being picked up by induction coils mounted at the front of the train. The apparatus incorporates two separate systems: the Safety Signalling System which ensures the safety of the train; and an automatic Driver Signal Command system which controls the movement of the train throughout its journey in accordance with a pre-determined operating schedule. A traffic controller at a central control station can, however, alter this schedule by remote control and thereby send fresh commands to the train. The equipment is designed to fail safe and trains are stopped by the automatic application of the brakes should any dangerous failure or loss of power occur. A driver travels with each train to take charge in case of failure of the automatic equipment, and to act as guard for the passengers. It is hoped that this system of automatic operation will be used on the new Victoria Line.

Other systems of automatic or semi-automatic operation are now being studied by European railways as well as the Japanese, but I doubt whether we shall reach a stage where the driver can be dispensed with entirely on passenger trains, though this may be feasible on freight trains. It seems unlikely that we shall ever be able to produce at an economic price




A diesel cab mock-up built at Derby to demonstrate Brigadier Langley's proposals. Note the large speedometer, the 24-hour clock, the cover over the brake gauge not in use.

**KEY**

1. AWS re-set button
2. Engine air brake gauge
3. Clock
4. Wheel-slip light
5. Overload re-set
6. Engine start
7. Engine stop
8. Fault light
9. Engine stopped light
10. Train air brake gauge
11. Vacuum brake gauge
12. Speedometer
13. Dimmer
14. Ammeter
15. Main reservoir
16. Dimmer
17. Dimmer
18. Proportional brake
19. Window wiper
20. Window washer
21. Instrument dimmer
22. Control handle
23. Reverser
24. Locomotive air brake
25. Wheel slip
26. Sanding
27. Horn

infallible equipment, or to maintain it at such a standard of perfection that breakdowns never occur. We must therefore accept and cater for occasional failures. As every system of control is devised on the "fail safe" principle, danger should not arise, but the breakdown of automatic operation will stop traffic. In these circumstances a human rather than a robot will be needed to take charge and rectify the defect, or else to operate the train manually so as to clear the line and get other traffic moving again.

On lines carrying freight trains exclusively, completely automatic operation, such as is in use on the Post Office Tube Railway, is practicable. Some automatic means of notifying a breakdown is desirable, and staff should be available at selected points to proceed to the scene of the trouble rapidly and deal with the emergency.

## Fire precautions in Channel Tunnel

The recent report of the Anglo-French team of Government officials holds out a promise that a Channel Tunnel may at last become a reality. The operation of trains through such a long tunnel will present a number of safety problems. Electric overhead traction will undoubtedly be used, maybe with automatic train operation or else with speed control and train stopping equipment. Whatever system is adopted, the chances of a collision must be eliminated as far as is humanly possible. A fire is probably the greatest hazard because in a car-ferry train motorists may be allowed to remain in their cars while they are being conveyed in vans through the tunnel. Their cars may not be in first-class condition, and the casual and thoughtless driver may be tempted to light a stove for a meal, or be careless with cigarettes. Road accident records suggest that this risk is slight, but it cannot be ignored. The car trains will have to be designed so that sections can, if necessary, be isolated rapidly, and they will have to carry adequate fire-fighting equipment and staff. Special ventilation will be needed to disperse fumes quickly should a fire ever occur.

## Radio control of freight lines?

Radio has been in use on railways for many years, principally in marshalling yards where radio links between the controller and the shunting engine driver and the shunting staff have added to the efficiency and speed of operations. Radio links with moving trains have also been established. They have not, however, been sufficiently reliable for the safe control of trains, owing to the difficulty of directing messages to one particular receiver which can be identified without fail, and of ensuring that messages to and from that receiver will not be overheard by any other.

This problem has been solved to some extent by the development of a selective radio calling system, whereby each locomotive receiving set has a selector that responds only to its particular code, and the central controller has the equivalent to a telephone dial which enables him to call one particular locomotive without alerting the others. There are many difficulties still to be overcome before sufficiently reliable communication can be established between controller and driver; interference from outside sources may give trouble, whilst deep cuttings and tunnels present problems, and an intensive network of transmitter/receiver stations may be needed.

Should development prove successful in establishing the reliability, selectiveness and integrity of this equipment it might be used eventually to control train movements on freight lines, and lead to the removal of signals and the withdrawal of signalmen, since it should be possible to operate points remotely by radio. The use of radio to give a direct link between the drivers of trains on passenger lines and signalmen and controllers might also be of value, especially in emergency, but to extend its use to the control of passenger trains is not recommended.

## NER's inductive radio for yards

A unique adaptation of inductive radio telephony communication is being developed in the North Eastern Region for use in the Healey Mills, Tyne and Tees marshalling yards, to enable the central controller and yard inspectors at various points to speak to shunting engine drivers, and for the hump signal aspects to be repeated in miniature in the locomotive cab.

The transmitting system is designed on the "fail safe" principle, so that a stop signal is automatically given to the driver should anything go wrong. This principle requires the continuous transmission of a radio signal, which is not permissible on high-frequency radio bands on account of its interference with normal radio telephony. Hence, an inductive radio system is being used. The transmitting aerial is in the form of a long loop around the perimeter of the marshalling yard, so that signals from it are confined to the locality. Signals and speech from the control room and inspectors' offices will be sent inductively via this loop, but as the system is not suitable for return transmission from a small locomotive aerial, the driver will reply through a UHF radio link.

## The possibilities of radar

Suggestions have often been made that radar should be introduced on railways to enable a driver to get warning of obstruction ahead. Normal radar, which works in straight lines is, however, quite incapable of distinguishing structures and moving loads that can be passed with safety from the rare obstruction that might cause danger. Experiments are now being made with radar guided by wires or metal conductors fixed in relation to each track so that obstructions on the individual line, such as a train ahead or car at a level crossing, can be detected, as well as obstruction caused by a derailment on an adjoining line.

A system that has been tested in this country comprises a copper conductor suspended above the sleeper ends, along which pulses of electro-magnetic energy are sent at the speed of light with a practical range of about 5 miles. With this system it should be possible to detect an obstruction within 12in of the cable and to determine whether it is stationary or moving, and if so its speed and direction. The conductor as at present designed must be suspended at least 12in above the sleepers to prevent their interfering with the pulses, and in such a position it presents an obstruction to platelayers engaged on the maintenance of the track. In order to overcome this difficulty, further research is about to begin with a conductor so shaped that the electro-magnetic field is asymmetrical and projected upwards, thus enabling the waveguide to be placed centrally at sleeper level.

It is suggested that radar transmitters might be placed alongside the track at intervals corresponding with the range of the impulses, and with transmitters at junctions placed centrally to scan the guide waves along each converging track. The information so collected could be transmitted by cable to a central office where, by means of computers, the position of every train could be controlled continuously. Locomotives could be fitted with comparatively small and simple pick-up equipment to collect from the conductor information about the condition of the track ahead, and the same equipment might be used for transmitting messages between controller and driver.

A great deal more research and development are needed before this or similar equipment can be installed as a practical proposition, but it might well form the basis for the automatic control of trains, enabling them to maintain the correct speed and space interval, and to be stopped in accordance with the planned timetable or in emergency.

In Japan a corrugated metal conductor has been developed for use on the New Tokaido line. The conductor is made in the shape of an inverted "Y" with corrugations at the two base sections and serrations along the top of the vertical stem. This conductor, which produces an asymmetrical field, can be mounted on the sleepers in the centre of the track and covered with a foam plastic material to protect it from the weather. Its present range is about three miles and it is only to be used as an obstacle detector. It may be developed eventually to form the basis of a moving block signalling system. The radar transmitters, unlike the British proposals, will be mounted on each locomotive and will need to be very much more powerful to cover the desired range.

Progress has been so rapid in recent years that it is difficult to forecast future trends. I am sure, however, that some form of controlled and disciplined land transport will always be needed despite—or possibly on account of—the phenomenal growth of the private road vehicle, many of whose drivers career around the country with thoughtless abandon, regardless of the congestion or even danger that they may cause.

MARCH 1965

## DIESEL TRACTION IN EAST ANGLIA

**Top:** A Dereham–Kings Lynn diesel multiple-unit arrives at Wendling on June 22, 1963. *Photo by J. S Gilks*

**Centre:** Brush Type 2 diesel-electric No. D5543 leaves Norwich Thorpe with the 16.20 to Liverpool Street on September 16, 1964 *Photo by S. Creer*

**Bottom:** English Electric Type 3 diesel-electric No. D6701 heads the 11.40 to Liverpool Street out of Norwich on September 12, 1964.
*Photo by J. S. Hancock*

# British Rail's campaign for Anglo-Irish traffic

G. FREEMAN ALLEN

*A visit to Ireland by the LMR's General Manager and the re-entry into service of the first of the Region's renovated Dun Laoghaire–Holyhead ships heralds a vigorous 1965 attack by BR on Anglo-Irish passenger and freight business.*

THE first weeks of 1965 were marked by the opening salvos of a strenuous British Rail campaign for Irish traffic. Closely following the Western Region General Manager's assertion in our January issue that the WR would "bid for the lot" via its Fishguard–Rosslare route, and the subsequent WR announcement of new London–Fishguard rail services, reported last month, came a flurry of LMR activity on behalf of its Holyhead–Dun Laoghaire route. A new poster campaign for the LMR service has been initiated throughout the country, at a cost of nearly £70,000; the first of the newly renovated ships on the route, the *Hibernia*, was shown off to the press; and the Region's General Manager himself, Mr. H. C. Johnson, travelled to Belfast and Dublin on January 11 and 12 to spearhead the LMR campaign.

The din of publicity trumpets in England roused some anger-provoking echoes just across the Border. The Stranraer Town Council protested that the Stranraer–Larne route was no longer mentioned in BR Irish travel brochures directed at potential traffic from London and the Midlands. Admittedly bookings on the *Caledonian Princess* car ferry are heavy, but this is largely the outcome of a new contract between BR and the Rootes Group, which provides for new cars from Midlands factories to be conveyed on block trains from Coventry to Johnstone, near Paisley, whence they are road-hauled to Stranraer for shipment by BR. This traffic is expected to total about 200 cars weekly.

In Glasgow on January 11, Mr. W. G. Thorpe, General Manager of the Scottish Region and Chairman of the Caledonian Steam Packet Co., conceded that last summer the traffic offering between Stranraer and Larne exceeded capacity, (the Chairman of the Northern Ireland Tourist Board had alleged that about 14,000 potential motoring parties could not find room on the ships last summer). This summer, however, a 1,000-ton drive-on drive-off ship, the *Lohengrin*, has been chartered for 16 weeks, from June 6 to September 24, to carry 300 cars each way daily. As it has no passenger certificate, the cars' occupants will have to cross on the twice-daily sailings each way of the *Caledonian Princess*.

## New car ferry enters service in July

On his visit to Dublin, Mr. H. C. Johnson called on Ireland's Prime Minister, Mr. Sean Lemass, whose wife was to launch the new Holyhead–Dun Laoghaire car ferry, *Holyhead Ferry I*, at the Hebburn-on-Tyne yard of its builders, Hawthorn Leslie, on February 17. The ferry is expected to carry 41,000 cars this year, but the build-up of traffic is anticipated to reach an annual level of at least 75,000 cars by 1970; it may well have grown to the extent of needing an additional ferry before then, in which event the 1970 figure might be considerably higher. The *Holyhead Ferry I* is scheduled to enter service on July 9.

Mr. Johnson said that the main reason for his visit was his desire to relate the improvements on the LMR, which he regarded as the main artery between Ireland and England, to the Republic's five-year Economy Plan. He stressed that the advances on the Region were not limited to passenger services; on the freight side, ships, quay facilities and equipment were to be modernised and a new service based on the employment of high-capacity containers was envisaged. The LMR is currently spending £3m on its services to the Republic.

## THE REBUILT "HIBERNIA"

**Right:** The newly modified *Hibernia* at Dun Laoghaire.

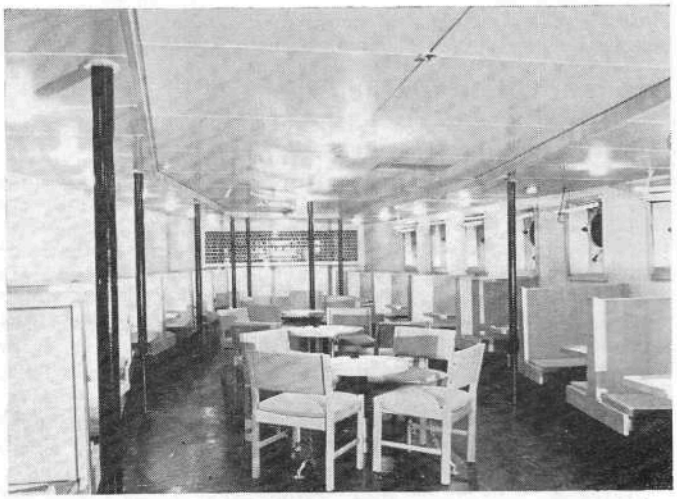
**Centre left:** The new second-class bar on D deck.

**Centre right:** The new second-class lounge on B deck; note the luggage racks suspended from the ceiling.

**Bottom left:** The redecorated first-class foyer on A deck.

**Bottom right:** The redecorated first-class dining saloon on D deck.
*Photos by British Railways*

**Facing page:** English Electric Type 4 2,000 h.p. diesel No. D315 emerges from the Britannia Tubular Bridge with a relief "Irish Mail" on July 27, 1963.
*Photo by J. Clarke*



In Belfast the previous day, Mr. Johnson referred to the publicity for road haulage's role in the development of Northern Ireland and affirmed his belief that the most efficient means of freight movement to and from Ulster would be found in the development of specialised rail containers, to which his Region had been giving priority. Results with the present container fleet had encouraged the LMR to draft schemes for new container ships and the modification of port facilities to handle the forthcoming high-capacity containers. On the passenger side, discussions were in progress with the Belfast Harbour Commissioners on the provision of a new passenger terminal. Mr. Johnson also said that after the completion of electrification from Crewe to London at the end of this year it was hoped to cut the Heysham–Euston journey time by about 1½hr to a schedule of close on 4hr.

## Post-war ships built to pre-war concept

The first tangible result of the LMR's programme of Anglo-Irish service improvements was the emergence from Harland & Wolff's Belfast shipyard in late December of the renovated m.v. *Hibernia*, now a 5,284-ton vessel as a result of extensive modifications. Its sister ship, the 4,972-ton m.v. *Cambria*, is just completing a comparable refit.

Although the *Cambria* and *Hibernia* were launched just after World War II, their design embodied a pre-war concept of Anglo-Irish traffic requirements. A mere 400 seats were provided under cover on each ship; moreover, first- and second-class accommodation was allocated a roughly equal amount of space. When new legislation was passed stipulating a much higher proportion of seating under cover, 2,000 seats had to be manoeuvred into rooms and passages not designed for them. As a result, the seats had to be made to a cramped bucket shape. At peak periods passengers have often had to travel in congested discomfort that aroused acerbic comment on both sides of the Irish Sea. In Ireland, the LMR has run a gauntlet of criticism that it was solely interested in milking a captive traffic and avoiding improvements that would reduce the financial return. Interest in the character of service on the Anglo-Irish sea routes is the stronger now because Irish dedication to development of tourism has become practically Swiss in its fervour.

Three years ago the LMR began drafting plans to alleviate what Mr. John Bustard, the LMR's Chief Shipping & Irish Traffic Manager, has frankly conceded were the often "appalling" travelling conditions on the Holyhead–Dun Laoghaire route, and to rebuild the fleet to match modern traffic requirements. The 2,917-ton *Princess Maud* was slated for withdrawal, to the sentimental regret of a few, but to the relief of very many more, particularly those responsible for the service who found an increasing number of passengers either deferring their crossing or going by air if they discovered that the *Maud* was on the job. A new car-ferry was proposed—and, as mentioned above, has now been launched with a new car-ferry terminal at Holyhead. Finally, the *Cambria* and *Hibernia* were to be rebuilt, at a total cost of £460,000.

## Extensive second-class improvements

The balance of first/second class accommodation in the rebuilt *Hibernia* has been cut to a ratio of one to four. Seating capacity in the second-class area of the ship has been increased by 750 (although the total seating on the ship has been reduced slightly from 2,355 to 2,285) following removal of the first-class smokeroom on the promenade deck and a number of first-class cabins on the upper deck. All second-class seating in the lounges and elsewhere under cover is of semi-reclining arm-chair pattern similar to that introduced on the Southern Region's latest Channel Islands ships, such as the *Sarnia*; ergonomically, it is admirably shaped either for sleeping or wakeful relaxation. In all saloons strong, capacious luggage racks have been suspended above the seats; the seats are designed to provide further room for small luggage beneath them and the number of baggage rooms on the ship have been increased.

New rooms for second-class passengers include: on the promenade deck, a lounge and tea-bar; on the upper deck, another lounge and tea-bar; and on the main deck, a self-service restaurant and smoke room. A new first-class smoke-room has been laid out on the upper deck. To cope with the augmented catering facilities, the ship's galley has been modernised and replanned.

To accord with the new furniture, the interior of the *Hibernia* has been decked out with new colour schemes and lighting in the contemporary idiom. This attempt to create a low-cost *Sarnia* is a brave try, but the new decor is a rather uneasy match for the outdated architecture of the ship, which needed more expensive concealment for thoroughly successful transformation. Its structure, however, is not as dated as some blankets in its second-class 7s-a-berth dormitories (8s if the bed is fully made up); these are elegantly embroidered "LNWR" and still look in excellent condition, which says a great deal for the durability of British woollen goods of the 1920s or earlier. The *Hibernia's* cabins, in which a berth costs 10s second-class and from 12s 6d first-class, have not been significantly altered.

Technical improvements on the *Hibernia* include a thorough and necessary modernisation of its fire precaution equipment, featuring the installation in numerous places of steel fire-curtains which descend automatically if the temperature exceeds a set danger level. Bridge fittings include a Marconi Argus 16 true motion radar unit and a Decca Arkus auto-pilot, the latest type of navigational aids.

## Sailing tickets needed for peak sailings

The LMR is confident that the rebuilt *Cambria* and *Hibernia* will have the capacity to meet all foreseeable traffic demands on the Holyhead–Dun Laoghaire route. At a press conference on board the *Hibernia* on January 6, Mr. Bustard asserted that neither ship has ever yet operated at 100 per cent occupation; even at the worst summer peak, the highest yet recorded has been 75 per cent. Moreover, the peaks were spreading on the passengers' own initiative; there were perceptible trends both from weekend to mid-week travel and from midsummer to late April and May or September and early October.

Nevertheless—and a little paradoxically—on the same day the LMR announced that on a number of peak days this summer traffic on its Anglo-Irish sailings is to be regulated by the issue of sailing tickets, both first- and second-class. Passengers who arrive at the ports on these regulation days without forearming themselves with sailing tickets, warned the LMR, would risk being forced to wait for a passage when space was available or having to travel in a different class, which would mean an extra charge if they had to go first-class instead of second-class to avoid missing the sailing of their choice.

## No renovation for the "Irish Mail"

Two questions about BR's Anglo-Irish traffic campaign for 1965 remain unanswered. First, one is baffled, not merely by the lack of co-ordination between the publicity ventures of the three Regions attacking the Anglo-Irish market, but by the almost open competition between two of them—with even an element of old-fashioned private-enterprise reluctance to reveal detailed plans in case they percolate to the enemy's ears. So much for the unifying image of British Rail. Regional accountability is admirable if it inculcates management with a zeal to balance Regional books; but there must be a risk of losing traffic to BR as a whole if a Region gets too preoccupied with building up its own originating revenue.

Second, it seems a pity, when close on £¼m was being spent on the refurbishing of the Holyhead–Dun Laoghaire ships, that a comprehensive job was not done by throwing in a renovated "Irish Mail" train. Proportionally this would not have added a great deal to the costs already accepted in respect of the ships. It is true that, as between Euston and Heysham, a cut of about 1½hr in travelling time between Euston and Holyhead is predicted for 1966, after electrification. But one is surprised that the BRB and LMR did not see the much stronger impact which might have been made by a "package" transformation of the service through from Euston to Dun Laoghaire. Designs exist at Marylebone Road for a second-class open day-night coach, with semi-reclining aircraft-type seats. An "Irish Mail" re-equipped with second-class accommodation of this kind would have been the obvious partner for the modified *Cambria* and *Hibernia*, to give second-class passengers reasonable cat-nap or sleeping comfort all the way from London to Ireland, apart from the transfer between train and boat at Holyhead.

# TRAFFIC DIVISIONS OF BRITISH RAILWAYS — 3

English Electric Type 4 diesel No. D319 leaves Stoke with a Manchester–Euston express. *Photo by C. T. Gifford*

**Marcus Newman**

# Stoke

## PART 2

*Traffic capable of ready adaptation to the latest BR bulk freight operating methods is limited in the Stoke Division. But in coal, steel, silica sand and particularly gravel, opportunities to increase business have been seized*

ADMINISTRATIVELY, the Stoke Division is of particular interest as it is one of the first on BR to initiate the new concept of station managers throughout its territory. The station manager is intended as the small-scale equivalent of a Divisional Manager at local levels. His primary purpose is to improve the efficiency of local management. At a large, compact traffic centre, like Nuneaton or Stafford, to cite two examples from this Division, one station manager will take over the responsibilities previously exercised separately by station-master, goods agent and yardmaster. He will co-ordinate commercial, movements and rolling stock maintenance work throughout his bailiwick. At more complex centres like Stoke itself, with its closely neighbouring industrial towns, some modification will probably be necessary.

Apart from Crewe, Nuneaton, Stafford and Stoke, the Division is being split up into seven areas, each of which will be administered by a station manager. The first, with head-quarters at Leek, was appointed at the close of 1964. Others will be based on Whitchurch, Market Drayton, Congleton, Uttoxeter, Stone and Tamworth and all should be at work by mid-1965.

### *New approach to marketing*

Like other LMR Divisions, Stoke underwent an important change at the beginning of 1964 when the whole of the Region's marketing organisation was reshaped. The essence of the plan was a concentration of sales effort and a refinement of its quality. Thus Stoke's nine sales representatives were reduced to four, on a higher salary scale, who were given a status on the same level as their colleagues in outside industry of commen-surate size. Their sole job is to sell rail services direct to the customer. They have their own cars and operate from their own homes, reporting by post or telephone to the Division's Sales Manager, who is the Commercial Manager's deputy. At Divisional headquarters the sales force has the backing of an Indoor Sales Assistant, whose job is to provide the maximum statistical and clerical support for the men in the field and to analyse the information which they feed back to him.

One of the Commercial Manager's chief tasks—and it is not an easy one—is to integrate the sales effort with the other facets of his work. There is, first of all, the importance of co-ordinating sales talk with work on rates—although here as elsewhere on BR there is, so far as concerns the bulk traffic the railway is particularly seeking, lessening risk of any rate quotation being an unsafe gamble. The flexibility afforded by rate-charging freedom and the economy of modernised working combine nowadays to produce prices so keen that even railway officers are happily surprised—and still they show a surplus. Watch must be maintained on the opposition; a road licensing clerk is the chief source of intelligence in this direction. An eye must be kept open, too, for possibilities of new traffic and care taken to see that the salesmen time their approach judiciously and are properly briefed on how best the railway can handle it; this requires close liaison between the sales force and the Commercial Manager's Development Section, one of whose tasks is to make a close study of the characteristics of any new business for which the Division thinks of bidding.

Not least, the salesmen need the backing of a strong claims prevention organisation. Damage in transit is still, with un-reliability, the railway's biggest handicap in competing for merchandise traffic, and the problem is being handled at the highest management level. The Commercial Manager chairs the Divisional Claims Responsibility Committee, which also

MODERN STOKE DIVISION STATIONS

includes the Movements Superintendent and a senior BRB Police Officer, and which meets at frequent intervals. Their primary concern is not whether or not to pay on claims already submitted, but how to prevent the incidence of claims by tackling their causes at source. One important step taken of which good results are envisaged is thorough organisation of the work of the claims prevention inspectors, who are directed to the places where they are most likely to check damage or loss before it occurs.

Some causes of damage are, of course, beyond purely Divisional control. Bad loading and clumsy marshalling can be checked, but occasional unsuitability of equipment and the considerable amount of loose-coupled working that persists, even with brake-fitted wagons, are matters that need rectification at a higher level. Bigger vans and also vans better suited to palletised traffic are other developments some freight men in the Division would particularly like to see.

## NCB is Stoke's biggest customer

The Stoke Division's biggest customer for originating freight is the National Coal Board, for there are a dozen collieries in the Stoke neighbourhood and around Rugeley and Nuneaton. But because the pits are almost on their doorstep, too many local merchants are tempted to employ hauliers or their own vehicles to get the coal direct from the pitheads by road. This temptation has been increased by the start of household coal concentration schemes, which have already driven perhaps 30,000 tons of the Division's coal traffic on to the roads. The number of collieries in the Division accounts for the comparatively large number of these schemes, of which there are no fewer than 16; three of these are single consignee projects.

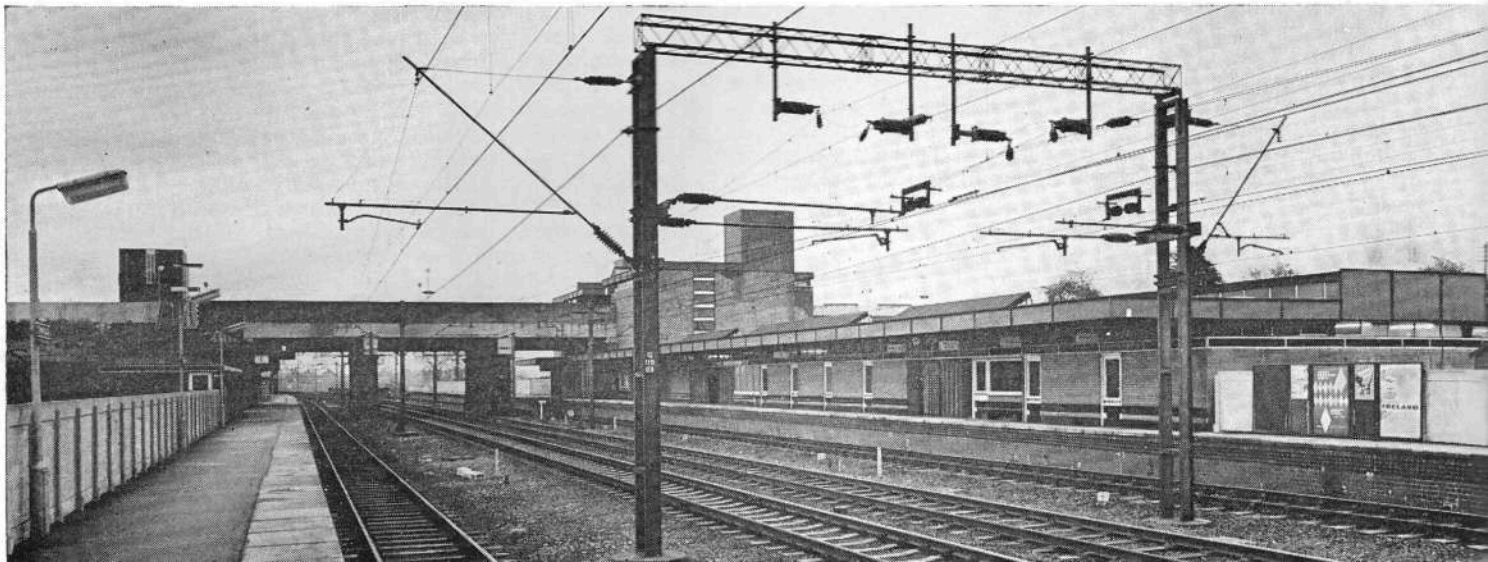
Strenuous efforts are made to combat the trend away from rail. Sales representatives make a point of following up any approach for a firm's forwarded traffic with an enquiry about their fuel supplies and an attempt to persuade them to receive by rail if they are not already doing so. On the larger scale, two CEGB power stations at Barlaston (Meaford) and Rugeley offer the Division a chance for healthy traffic in block trainloads, though the hauls from the pits are short.

## Co-operation secures new steel traffic

An important opportunity is coming the way of the Stoke Division in the re-equipment of the Shelton Iron & Steel Co., at Etruria. This, the oldest steelworks in the country and a subsidiary of John Summers, has been rebuilt with a new plant of Continental pattern that makes it possible for relatively small plants to compete with the modern titans of the trade, like John Summers own works at Shotton. In consequence, the output and sales of the Shelton works are expected to increase substantially. As the works is on top of a coalfield, there is little BR business in this raw material, but block trains supply all the plant's iron ore, chiefly from Northants and Oxfordshire, though some is imported and is brought across country from Birkenhead.

Hitherto, the Stoke Division has won a fair proportion of the Shelton works' finished traffic, but its markets are not far away,

**Above:** Exterior view of the entrance to the rebuilt Stafford station (*left*); and an up West Coast express headed by an English Electric Type 4 entering Stafford station before the commencement of through electric working to Rugby (*right*). **Below:** The modernised Tamworth station. *Photos by British Railways*



in the West Midlands and Black Country, and the consignments are comparatively small, with the result that BR has not found it easy to compete with road hauliers on either service or price. The rebuilding of the works and the prospective increase in its output, however, holds out hope for BR to get in on the ground floor with more attractive rates based on more economical working of larger consignments. The Stoke Division has sought to work as closely as possible with the Shelton management throughout its rebuilding operation and the new plant has been designed for convenience of loading the finished steel straight on to rail wagons.

Another traffic with a good prospect of expansion is sand and gravel. Gravel production is steadily increasing in the hilly country of north-east Staffordshire, while roadstone is quarried in the Nuneaton neighbourhood. Modern block train conveyance of large quantities at very competitive rates is opening up possibilities for BR to help the gravel firms expand their markets.

Already the Stoke Division does good business with silica sand from Oakamoor, where British Industrial Sand Ltd. set up four years ago a plant which supplies a large part of the chief raw material for South Lancashire's glass bottle industry. High-quality silica sand is also used in abrasive household cleaners manufactured at Warrington and Port Sunlight. BR are carrying about 80 per cent of the traffic, which means close on 250,000 tons a year, and this amount may increase.

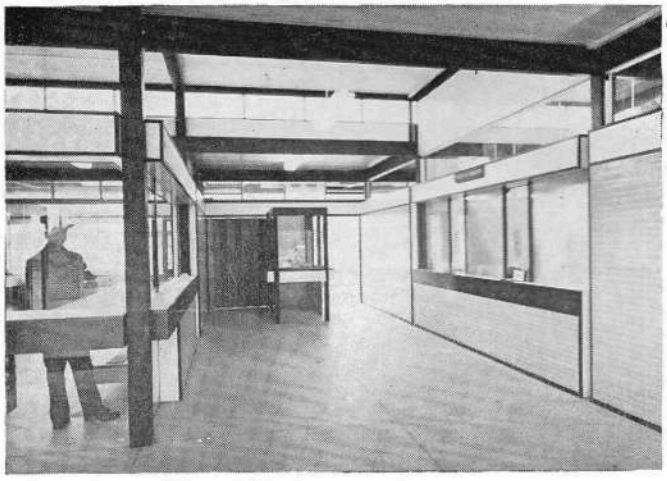
The silica sand for the glass industry travels in 25½-ton hopper wagons, which are loaded from an overhead silo at Oakamoor. They run in block trains to Lancashire, where they are detached into groups for the various works at St Helens, Warrington and Garston. The silica sand for household cleaner manufacture at Port Sunlight is moved principally in groups of Prestwins, working in circuit. Smart transits and quick turnrounds have helped to achieve the very competitive rate that has kept this traffic on rail.

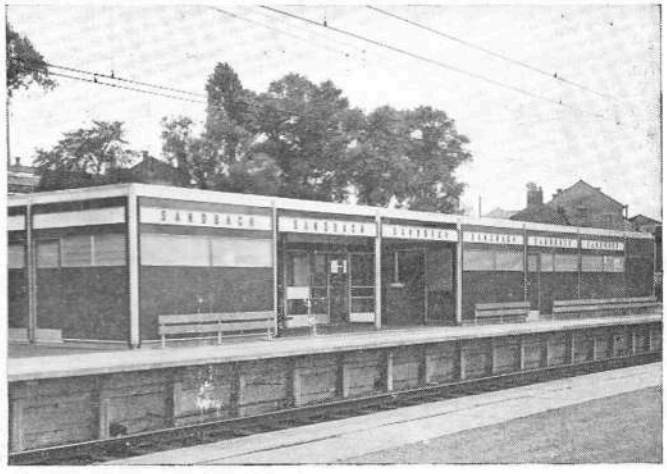
## Block gravel trains to the south?

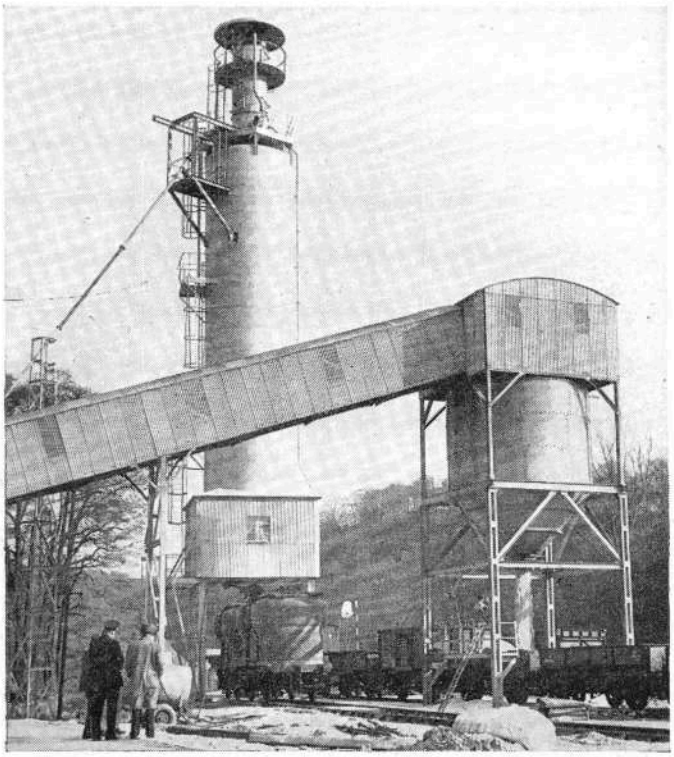
The Stoke Division is already working block trainloads of gravel in 21-ton hoppers to Manchester and Liverpool from Cheadle, to which it is brought by road from two pits in the neighbourhood. But this, the Stoke management hopes, is merely an introductory exercise. Its commercial officers talk enthusiastically of the quite economical but really keen rates they now realise they could offer gravel operators for massive trainloads of 1,000 tons behind diesel or electric traction. On these terms, they foresee, gravel pits in the Division could compete economically for big construction contracts in the London area on the railway's undertaking to maintain a reliable pipeline of a trainload a day. In the same way, a great deal of the West Midlands could be supplied from the Cheadle and Rugeley area.

Of the trade with which Stoke has a historic affinity, pottery, the Division has of late regained some losses to road, particularly in export goods. Three years ago, virtually none of the export traffic via Liverpool went by rail, but now it is running at a level of about 600 tons a week and expanding fast. This

**Below left:** The booking hall of Tamworth station. **Below right:** Sandbach, one of the prefabricated station buildings erected at intermediate stations between Manchester and Crewe. *Photos by British Railways*







**Above:** Prestwin wagons are loaded at the British Industrial Sand Ltd's installation at Oakamoor.

**Facing page:** The sundries freight terminal at Stoke. *Photos by British Railways*

**Below:** A Stanier Class 8F 2-8-0 heads a mineral wagon train out of Stoke to the south, past an empty diesel multiple-unit. *Photo by C. T. Gifford*

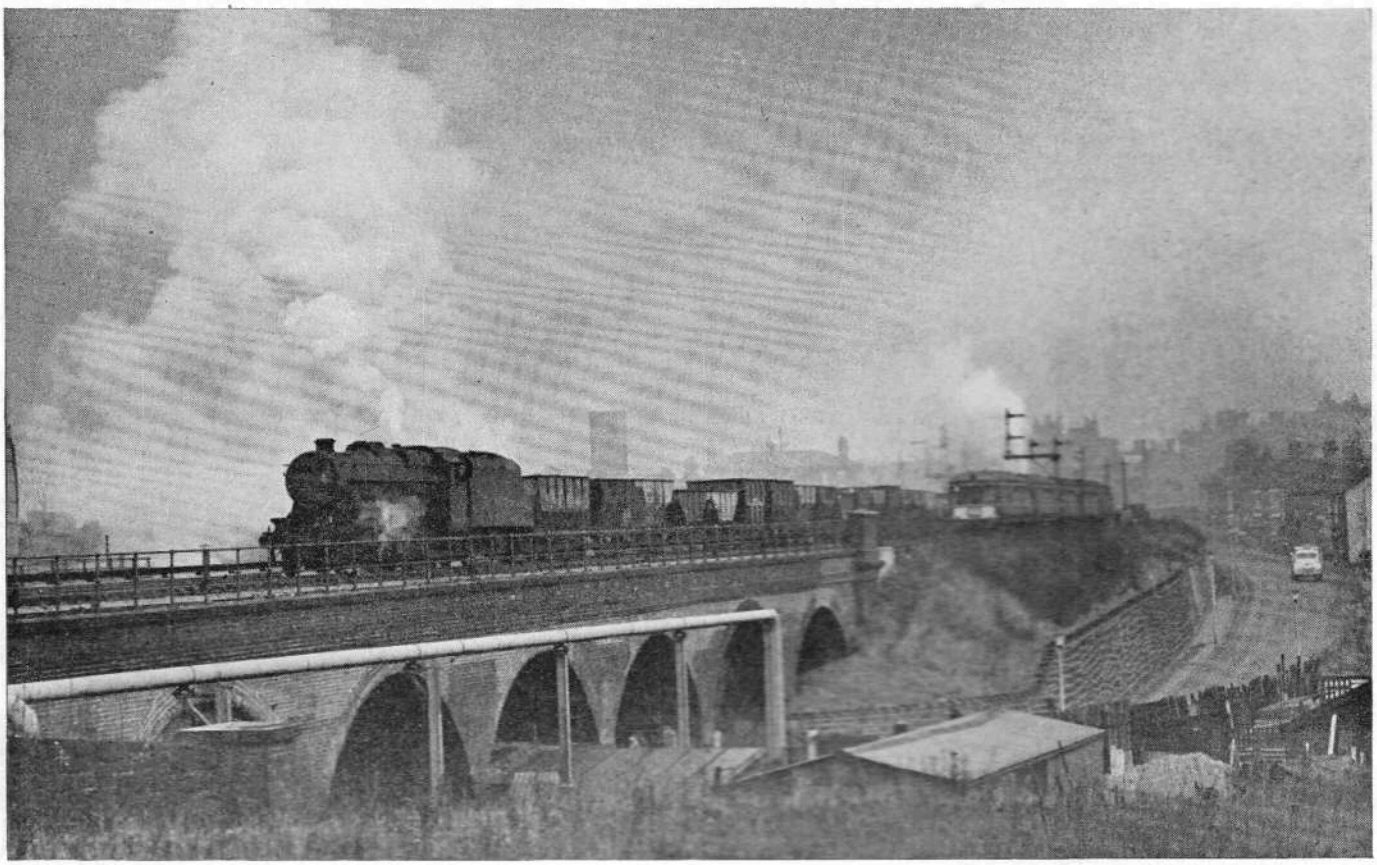
business has been retrieved largely by a thorough reappraisal of costs and hence of rates, and by encouraging exporters to take advantage of the Portex scheme, which puts their consignments under the constant scrutiny of Control and ensures reliability. To recapture home business is more difficult, because so much of it travels as less-than-wagonload sundries. Only about six full loads a day can be made up for any one destination; the remainder goes into wagons of town delivery and transhipment traffic to approximately 80 destinations.

## Depots cut by two-thirds

When the Division was created, it had 98 freight depots of various kinds. Of these about 40 have already been shut down. By the end of this year closures should have brought the total down to its planned figure of 33; this figure includes depots specialising in one traffic, such as coal, oil, or limestone and cement, as well as installations catering for general full-load, sundries or agricultural traffic. It is hoped to set up agricultural fertiliser concentration depots at five of these locations.

Sundries traffic is being concentrated on Crewe, Nuneaton, Stoke and Uttoxeter. Crewe is one of the handful of Residual Tranship depots nominated under the National Sundries Plan and this has helped to gain the place some unwanted notoriety. Undoubtedly it is going to take time to educate the public into acceptance of a peculiar routing via one of these depots for a package that cannot find a direct wagon service from its point of consignment to destination. Recently, traders have found the situation harder still to accept because shortages of staff and of Vanfits have held up the work at Crewe and led to temporary embargoes on traffic for the depot, provoking at least one irate customer to erupt in the correspondence columns of a national newspaper.

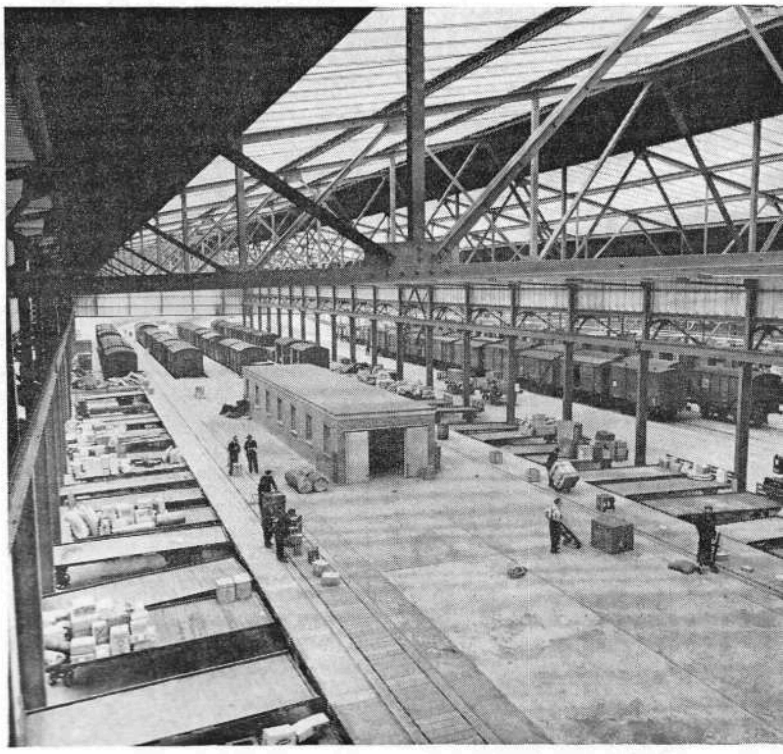
Many railwaymen on the ground nowadays are unhappy about the current wagon situation and privately endorse their customers' protests that the stock reduction of a number of vehicle types and containers has been far too draconian. On the other hand, the Movements Superintendent at Stoke, Mr. I. H. Hambidge, strongly argued to me that since October, 1963, when the BRB established the Central Wagon Authority and the new procedure of wagon control, wagon performance had enormously improved. It had preoccupied so many staff at all levels with achievement of quick loading and unloading that



wagon cost-consciousness was becoming almost as much a trait of railwaymen as an instinct for safe working. On the practical level, average turnrounds had been significantly shortened.

A nagging worry of the Division since its formation has been a serious shortage of office accommodation. Of just as much concern, in this reporter's view, is its quality, so far as concerns the headquarters. Sentimental reverence for relics is all right in its place, but its right place is certainly not the hub of a large industrialised sector of a railway system currently intent on updating its image out of recognition. The offices, their furniture and particularly the sanitary arrangements of the old North Staffordshire Railway building adjoining Stoke station are almost squalid by comparison with today's working quarters in industry generally. Potential customers who visit railway officers there are bound to come away with a lurking suspicion that all is as it ever was on the railway, however dynamic the verbal picture of modernised service they have been given by their hosts. One would have thought that the facelifting of offices where business may be done with the railway's most influential customers is just as crucial to modernisation of the image as, for example, refurbishing rolling stock.

I found morale in the Stoke Division running at a high level. Initial difficulties over headquarters staff reluctance to transfer from Crewe to Stoke have been largely overcome, though the shortages of operating staff endemic in industrial areas nowadays persist and force too much extemporisation in freight working for comfort. The encouraging feature, however, is that the staff generally have been infected with enthusiasm for, and confidence in the future of, the railway. And increasingly their optimism is rubbing off on the public.

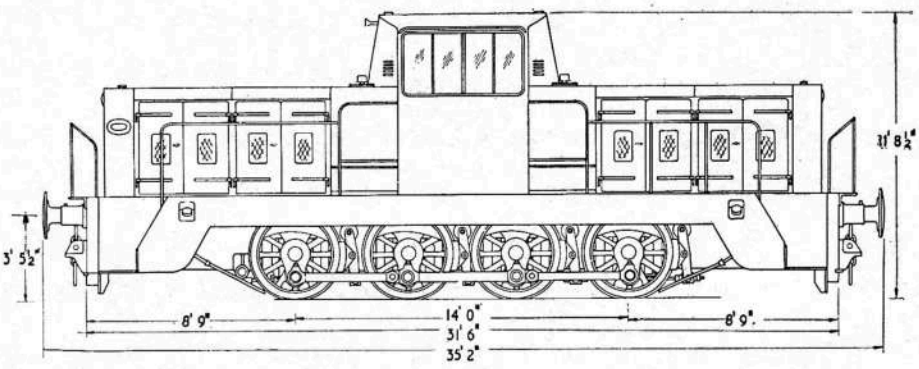


# POWERFUL HUNSLET DIESEL-HYDRAULICS FOR THE NCB

THE Hunslet Engine Co. Ltd. has received an order from the Coal Products Division of the NCB for two 776 h.p. 60-ton diesel-hydraulic locomotives, which will be the most powerful in service with the Board. They are to be used on the Coventry "Homefire" project, a new plant in the Midlands producing smokeless fuel, to handle local working and traffic between the plant and the interchange sidings with BR. The work involves hauling 450-ton trains up gradients as steep as 1 in 49 and braking 600 tons on this gradient when travelling in the opposite direction. It is believed to be one of the heaviest duties involved in NCB rail operations.

This class (*see diagram below*) was recently introduced into the Hunslet range of industrial shunting locomotives. It is on 0-8-0 with a wheelbase of 14ft enabling it to work through curves of 350ft radius without gauge widening or thinning the flanges on the intermediate wheels. Power is provided by two Cummins Type NT.400 diesel engines, each developing 388 h.p. at 2,200 r.p.m. As an alternative the locomotive can be fitted with either Rolls-Royce eight-cylinder supercharged or turbocharged engines giving a locomotive power of 622 h.p. or 764 h.p. respectively. The transmission consists of two twin-disc CF 11500 series torque converters with cardan shaft drive to Hunslet Type 350 final drive gearboxes mounted on each intermediate axle.

Hunslet now offer two distinct ranges. The first utilises Gardner medium-speed 6L3B and 8L3B engines and Hunslet frame-mounted hydraulic transmission units. These are of 195 h.p. and 260 h.p. The second range covers Cummins or Rolls-Royce-powered locomotives from 233 h.p. to 776 h.p. in three basic types, utilising a maximum number of standard components for efficient spares coverage. These three types comprise 30- to 38-ton four-wheelers, 36- to 55-ton six-wheelers, and 60- to 70-ton eight-wheel locomotives. The entire range incorporates Hunslet final drive gearboxes and either "Hunslet Twin" or twin disc hydraulic transmission.




## LETTERS

Concluded from page 125

train timings. I quote, for example, the 16.30 Glasgow Queen Street to Alloa, which arrives in Bishopbriggs often at 16.36 and then waits until 16.40 before its booked departure time. This must be very annoying to through passengers.

Bishopbriggs. S. RICKARD.

### Our own new image

SIR,—I am sorry you have found it necessary to issue MODERN RAILWAYS in such large dimensions. I preferred the previous size, which was much easier to accommodate on bookshelves. However, I do appreciate your reasons and the presentation of the January issue is commendable.

I must also express my disapproval of your following the deplorable trend of using small letters for proper nouns, particularly in the title of the magazine. *Please* let us have a capital "M" and a capital "R" as soon as possible. When all is said and done, the practice is wrong and consequently should be discontinued. Your internal block headings of "Letters", "Accident Report" etc. should also employ capitals.

After this, let me say how much I enjoy your most informative magazine.

Billericay. A. W. RUSSELL.

SIR,—I feel I must write to congratulate you on your "new image". Yours is truly a magazine which looks sensibly at the present and future of our great national asset, which must itself be given a modern image. Well done—a truly first-class magazine!

Tolworth. G. L. SPENCER.

SIR,—In my opinion the magazine is now far too large for convenience; the previous shape was ideal. The rise in price is very unwelcome though no doubt costs have risen. Would it not have been possible to reduce the content slightly?

The impression remains that the current mania for change for its own sake has caught up with the publishers. I, for one, will not be buying the magazine again.

Maj. A. N. CAMPBELL BALDWIN.

Beckenham.

G. M. KICHENSIDE

# Traffic control on the Gotthard line

*The Swiss Federal Railways' latest schemes to improve traffic flows, station and yard facilities and motive power are now reaching fulfilment. The potential bottlenecks on this heavily-used route—which became a serious handicap to the unprecedented traffic of mid-1963—are gradually being eliminated.*

IT is almost true to say that the smooth operation of traffic over the Gotthard main line of the Swiss Federal Railways—the vital and most important of all the rail links between Italy and neighbouring European countries—is governed by the Italian Customs officials. Delays to trains through Italian frontier formalities can quickly result in an accumulation of traffic on the Gotthard route and the effects of that may reach right across Switzerland to the French and German frontiers.

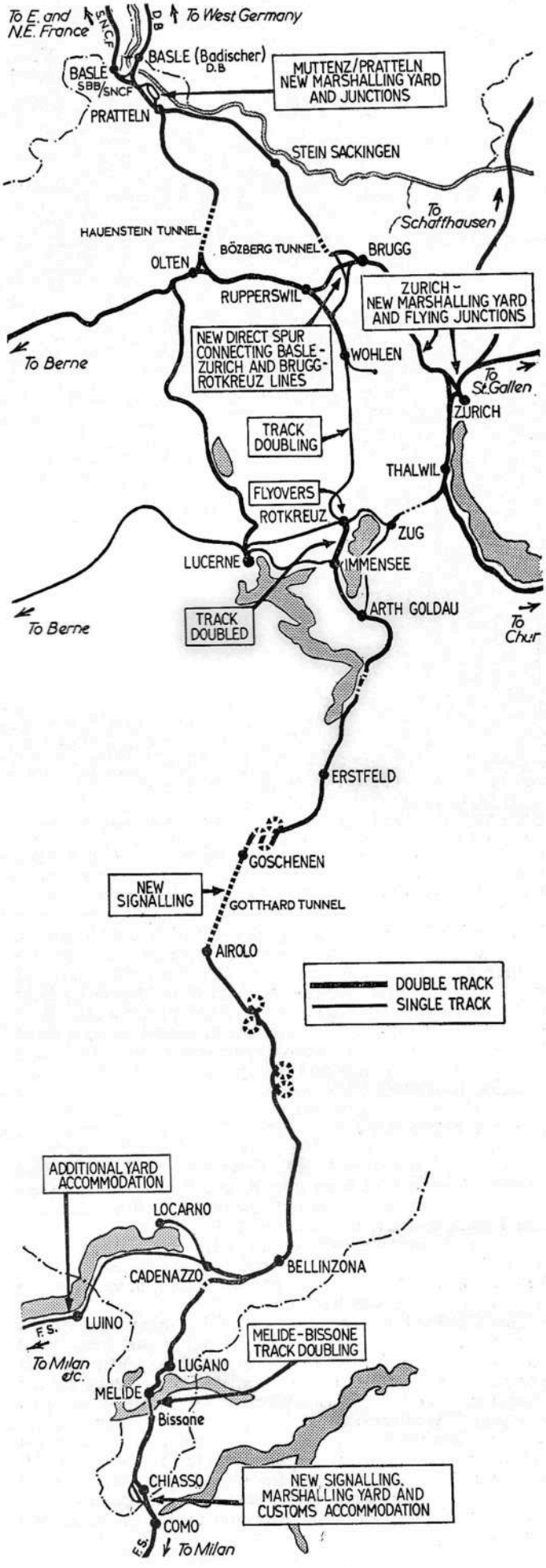
No one in Switzerland will quickly forget the aftermath of the severe 1962/3 winter. Traffic which had been frozen up for weeks—particularly from the Rhine barges and the ocean-going ships discharging cargo at Basle docks—was suddenly put on rail when the weather turned mild and outstripped the railway facilities to handle it. As a result, almost every station loop line over the Gotthard route was occupied by freight trains waiting to be passed into Italy. In turn, stopping passenger trains could not be overtaken by expresses and the consequence was a considerable decline from the punctuality standards for which Swiss railways are noted.

As can be seen from the accompanying map, the Gotthard main line proper runs from Arth–Goldau through Erstfeld to Göschenen, at the north entrance of the 9¼-mile Gotthard tunnel. From the south portal of the tunnel at Airolo, the line continues in the Italian-speaking Swiss Canton Ticino as far as Chiasso. In the north of Switzerland, Basle is the focal point of railway routes from France (also Belgium and Luxembourg and from the UK via train ferry services) and Germany (also Holland and Scandinavia).

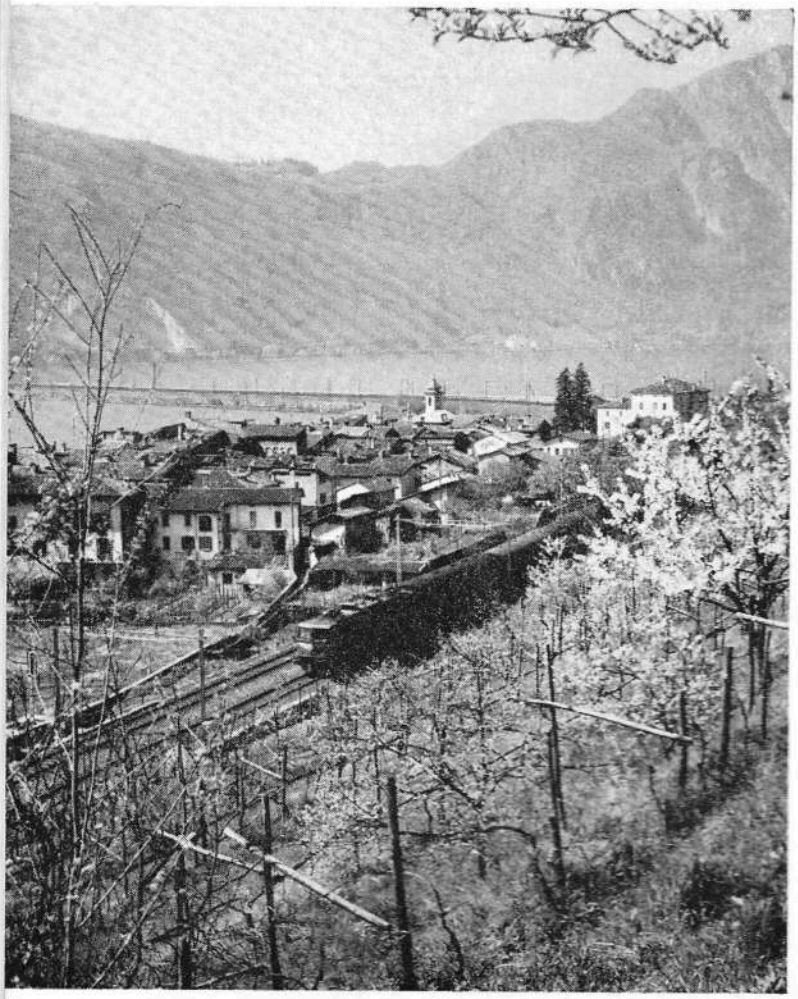
From Basle, two principal routes run south and south-east. The first passes through the Jura mountains by the Hauenstein tunnel to Olten and Lucerne and thence to the Gotthard. The second traverses the Jura mountains by the Bözberg tunnel to Brugg and Zurich, and runs thence through Zug to the Gotthard line. A third route, until a few years ago a minor cross-country line from Olten and Brugg to Rotkreuz and Immensee, where it meets the line from Lucerne to the Gotthard, now plays a far more important part in the handling of the Gotthard line freight traffic. On the southern part of the Gotthard line, Bellinzona is an important station near the junction between the main route through Lugano to the Italian frontier at Chiasso and the secondary route which crosses the Italian frontier at Luino, alongside Lake Maggiore. The Luino route at one time formed the principal southern approach to the Gotthard line, since the present line via Lugano and Chiasso was not built for some years after the opening of the Gotthard tunnel.

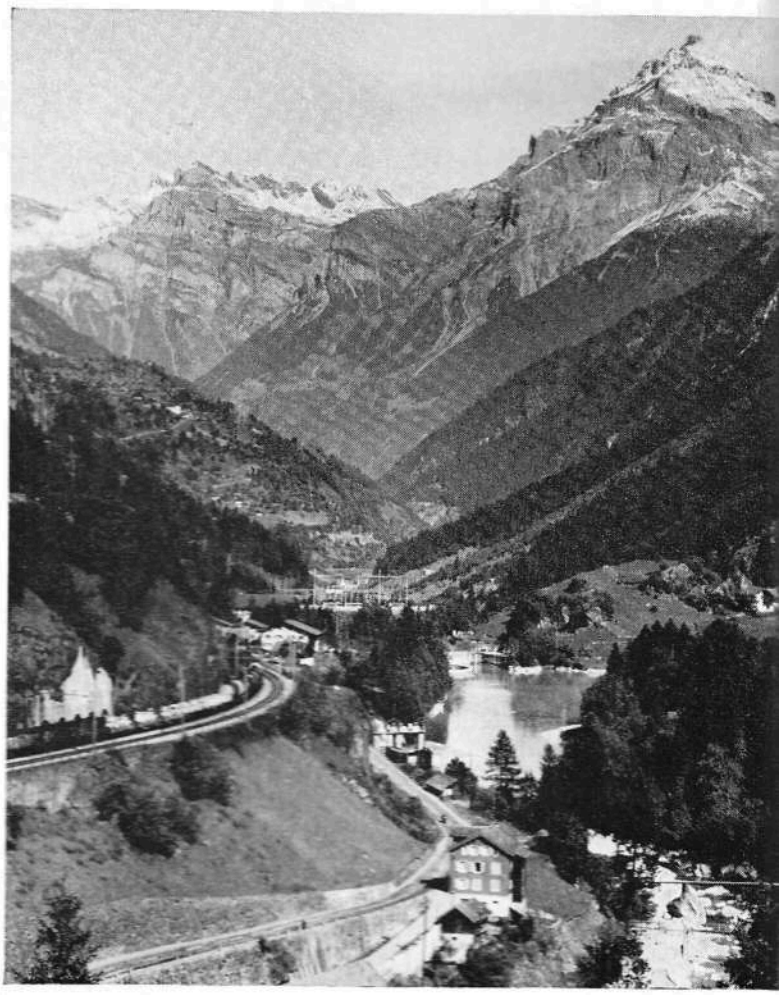
## Reversal and single-track handicaps

Both the original main routes from Basle to the Gotthard line via Lucerne and Zurich suffer because these stations are terminals where most through passenger and freight trains must reverse. Although a triangle outside Zurich main station allows a direct run from Brugg towards the Gotthard route, thus avoiding Zurich main station, the approaches to Zurich are already heavily congested and worked to the limit. Double track exists over most of the Lucerne and Zurich routes to the Gotthard, but the twin-track approach to Lucerne, which over the last 1½ miles into the station is worked as two single




The 8.12 Milan–Zurich "Ticino," formed of a Swiss Federal Railways four-voltage TEE unit, below Wassen on the Gotthard line. *Photo by Brian Stephenson*





**Left:** A view of the Melide causeway, carrying the Swiss Federal line across Lake Lugano, from behind the village of Bissone.
**Right:** The rugged country traversed by the Gotthard main line is apparent from this view of the route on its ascent of the Reuss river valley to the north portal of the Gotthard Tunnel. *Photos by Swiss Federal Railways*

lines serving four routes (Berne, Basle, Zurich and Gotthard), forms a traffic bottleneck. There are single-track sections on the Lucerne route from Lucerne to Immensee (12 miles) and on the Zurich route over the six miles from Horgen to Baar (between Thalwil and Zug) and the 10 miles from Zug to Arth Goldau. At the southern end of the Gotthard route a short length of single track exists over the causeway across Lake Lugano between Melide and Bissone, and the secondary line to Luino is of single track from the junction with the Locarno line at Cadenazzo. These single-line sections have naturally impeded traffic flows on what are otherwise double-track routes.

The basic international traffic flows over the Gotthard line consist of perishables from Italy to and via France and Germany, manufactured goods and raw materials from Germany and France to Italy, tourists, and Italian workers seeking or returning from employment in neighbouring countries. Switzerland itself exports industrial products through the Italian port of Genoa, on the Mediterranean, some of which must also use the Gotthard line.

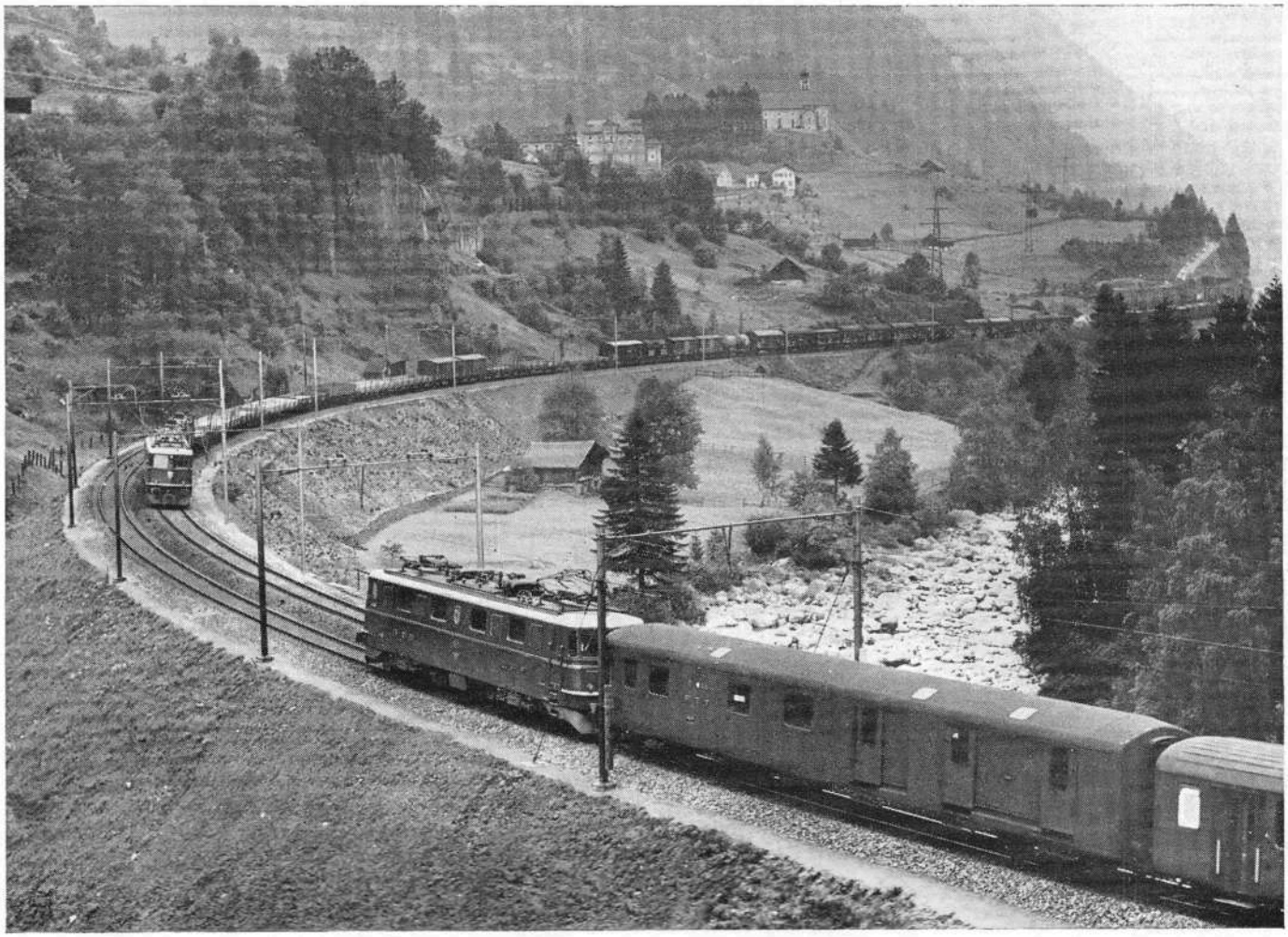
The Gotthard line owes much of its importance to its geographical position. It is the shortest route from West Germany, the French industrial regions of the north and east and the Benelux countries to Italy, and the revenue earned from the transit traffic is important to the Swiss national economy. The alternative Alpine rail routes through Switzerland via Lausanne or the Lötschberg tunnel to the Simplon tunnel cannot relieve the Gotthard route to any extent, for they are already worked to the capacity of their existing facilities and are more circuitous. The Gotthard's chief economic rival for German–Italian traffic is the rail route over the Brenner pass linking Austria and Italy.

Until recently freight traffic entering Switzerland from the north through Basle travelled to the Gotthard either via Lucerne or Zurich, but the Zurich route also carried a small proportion of traffic entering through Schaffhausen. Most of the through freight traffic was sorted at one of the yards in the Basle area and often again en route at Erstfeld, Biasca or Bellinzona.

That, briefly, was the situation in the early 1950s, when traffic over the Gotthard line was at virtually the same level as in 1939. Freight passing over the Gotthard between Switzerland's northern neighbours and Italy had fluctuated considerably. Taking 1939 as a basis of 100 it had reached 200.2 in 1941, but had dropped to 36.8 in 1945. The succeeding years saw a gradual restoration of traffic levels but not until 1951 did traffic in normal conditions exceed the pre-war figure.

## *Traffic trebles pre-war levels*

From 1953 onwards, with the gradual expansion of trade between northern European countries and Italy and, in more recent years, the establishment of the Common Market to which France, Belgium, Luxembourg, Holland, West Germany and Italy (but not Switzerland) belong, traffic passing through Switzerland began increasing rapidly, to such an extent that the existing Swiss rail facilities were in danger of being overwhelmed. Each year's traffic total showed a marked increase over the previous year's figures and by 1963 the comparative traffic percentage had reached about 300. In movements over the Wassen–Göschenen section of the northern approach to the Gotthard tunnel this represents an increase from an average of 86.1 trains of all types each day in 1939 to 192.9 every day in 1963. Over the section from Göschenen to Airolo



Swiss Federal Class Ae6/6 6,000 h.p. Co-Co electric locomotive No. 11425 on the 9.38 Chiasso–Zurich train meets sister locomotive No. 11470 on a southbound freight below Wassen on August 15, 1964. In the background can be seen the celebrated Wassen church, which re-appears in Gotthard line travellers' view three times as trains trace the Wassen spirals. *Photo by Brian Stephenson*

this figure rose to 227.5 trains a day in 1963, if the Gotthard tunnel car-ferry trains are included.

By 1954 it was already becoming clear to the Swiss Federal Railways authorities that special measures would be needed to cope with such increases if traffic was to be kept running smoothly. The short-term aim was to improve operational techniques and organisation with existing facilities, but long-term measures, providing for the enlargement of traffic bottlenecks and the easing of traffic flows by extensive constructional work and re-equipment with more powerful locomotives, were clearly necessary.

The Gotthard line proper in any event is one of the most difficult to operate in Western Europe, for it abounds in sharp curves and for over 40 miles—18 miles on the northern side and 25 miles on the southern approach to the Gotthard tunnel—is on continuous gradients of 1 in 37–40 to a summit 3,786ft above sea level inside the tunnel. Nearly all geographical junctions between Basle and Arth–Goldau are on the flat and conflicting traffic flows cause many regulation problems.

Until recently, traffic regulation on Swiss main lines was largely in the hands of the staff at each station. In Swiss signalling practice the operation of the block system and the signalling controls at each station are carried out from a signal room in the main station offices. Depending on the size of station, the signal room is under the direct supervision of the stationmaster, his assistant, or an inspector, known as the *sous chef*. The larger stations may have a separate signal cabin to control signals and points, but the signalman himself acts on the instructions of the *sous chef*. Thus regulation decisions at junctions, or at places where freight trains had to be looped to allow more important trains to overtake, were made by local *sous chefs*. Occasionally, local and uncoordinated regulation decisions arising from the *sous chefs'* necessarily limited view of the traffic had detrimental effects on traffic operation.

## Eight-point improvement programme

As I have already mentioned, frontier formalities, particularly those of the Italian Customs, at Chiasso, could often cause considerable congestion and delay to Gotthard line freight traffic. Sometimes the blockage would extend back to the north end of the Gotthard and occasionally freight traffic had to be held back at Basle or even in France or Germany. To find a remedy was clearly no easy task and entailed the Swiss Federal Railways in a study of the whole problem of freight handling, with the object of providing speedier transits and smoother, unimpeded traffic flows. The long-term measures proposed. involving substantial reconstruction and engineering works, were:

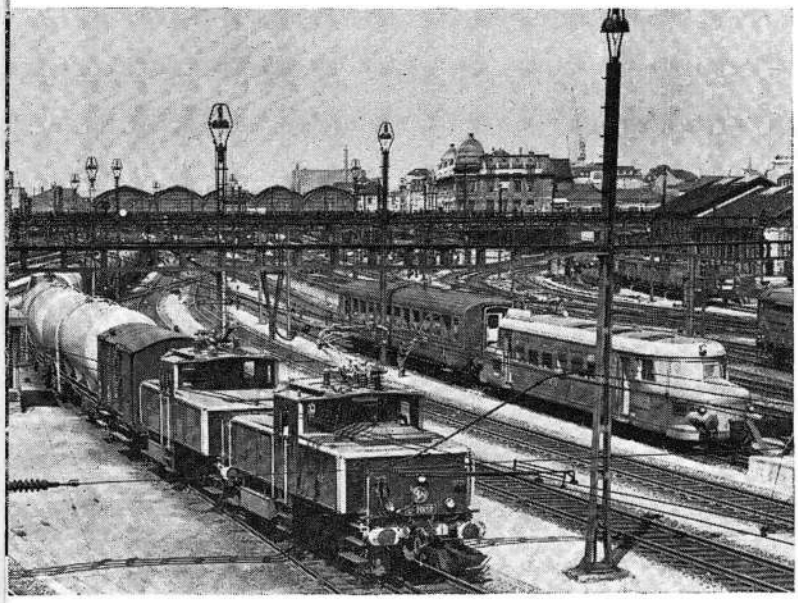
1. The rationalisation of marshalling yards at Basle and the construction of a new yard at Muttenz, on the north side of the existing yard, to cater for traffic destined for France and Germany. This traffic is at present largely handled by Basle Wolf yard, which is at the approach to Basle SBB station and hampered by lack of space and the complications of flat crossings. Both the old and new yards at Muttenz will have flyover access direct to and from the Zurich and Lucerne lines. Traffic to and from Basle Badischer DB station and Germany has been speeded by the doubling of the line over the Rhine bridge, which was completed in 1963. The work at Muttenz was started in 1962 and is expected to be complete in 1972.

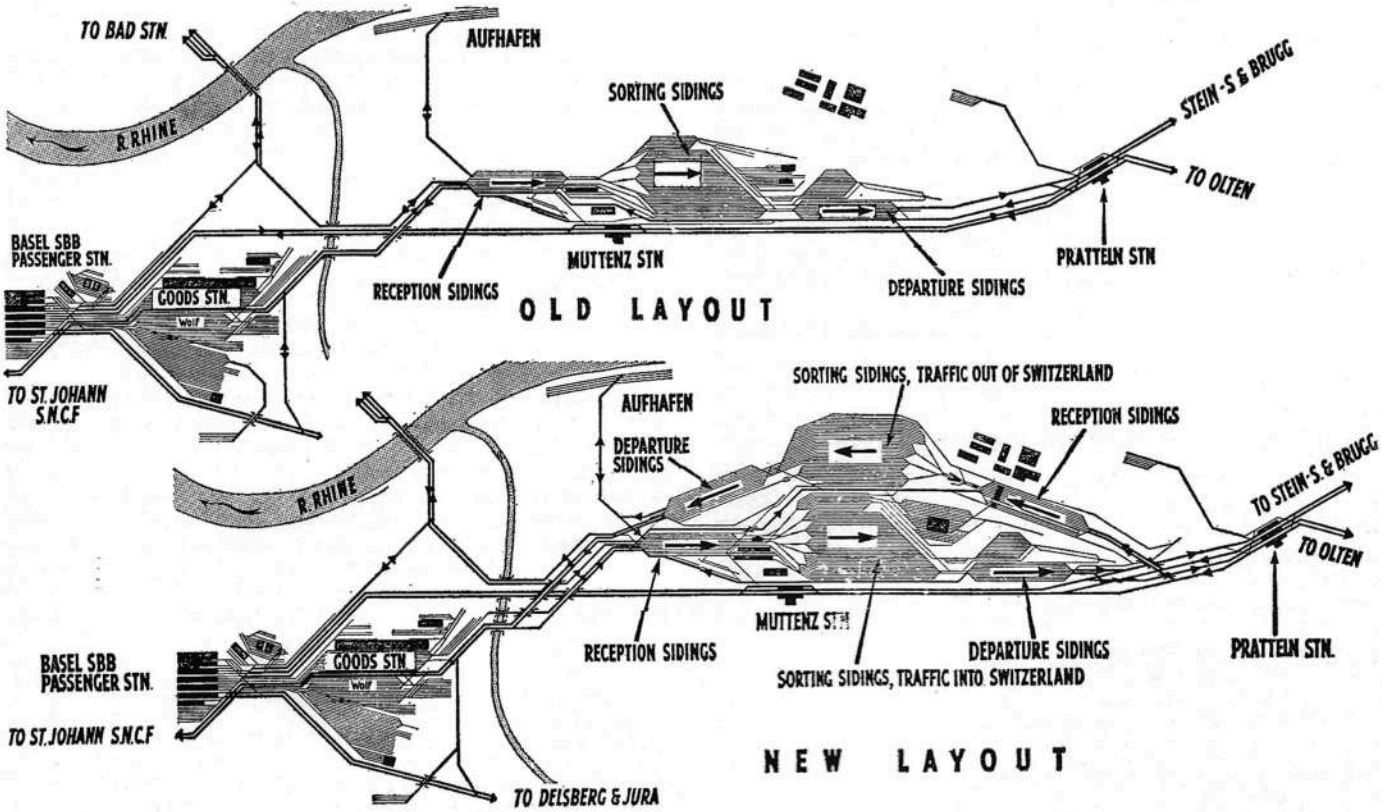
**Above left:** Two French Railways dual-voltage electric shunters pass through Basle SBB station with an oil train being transferred from French territory; on the right is one of the Swiss Federal's "Red Arrow" railcars, which are now being withdrawn.

**Above right:** Swiss Federal Class Em3/3 600 h.p. diesel shunter No. 18811 pauses between duties as a BR train ferry van is propelled over the hump of one of the yards south-east of Basle SBB station.

**Below:** Swiss Federal Class Ee3/4 1-C electric shunter marshals a southbound freight for the Gotthard line at Erstfeld on August 14, 1964. *Photos by Brian Stephenson*

**Facing page:** The old and new layouts of Basle Muttenz yards.






2. The concentration of through Gotthard line freight traffic on the former secondary route from Brugg to Rotkreuz and Immensee to avoid the reversals at Lucerne or Zurich; this requires the construction of a new spur at Brugg from the Basle–Zurich line to the Rotkreuz line, and the doubling of the line between Wohlen and Immensee.
3. The provision of improved signalling on the northern and southern ramps of the Gotthard approaches by additional intermediate block sections; and the complete resignalling of the 9½-mile Gotthard tunnel with 13 automatic block sections, to provide a headway of 1 to 3min instead of the former 7 to 12min.
4. The doubling of the last remaining section of single track at the south end of the Gotthard line between Melide and Bissone (to be completed in 1966).
5. The reconstruction of Chiasso yard, to segregate traffic flows and traffic requiring different Customs procedure, also to provide non-conflicting connections with the main line.
6. The provision of additional accommodation at Luino, on the secondary main line into Italy. Luino station is actually Italian-owned, but the reconstruction works here are being financed by the Swiss as an urgent necessity.
7. The initiation of a 10-year programme for locomotive modernisation to permit the haulage of heavier trains at higher speeds; this will be finished by 1967.
8. Although not directly connected with the Gotthard line freight scheme, extensive reconstruction work is also being undertaken at Olten on the Basle–Lucerne line, to segregate north-south and east-west flows, which at present cross each other's paths by flat junctions, and at Zurich, where new avoiding lines are under construction, together with a new marshalling yard at Limmattal, a few miles from Zurich, which will keep most of the through freight out of the immediate station area.

Already most Gotthard freights are using the route via Rotkreuz and Immensee, for the doubling of the latter section was completed in 1963, but at present they are running via the Lucerne route as far as Olten and there taking the north-to-east spur as far as Rupperswil to reach the Rotkreuz line. The ultimate aim is to transfer this traffic to the route via Stein-Säckingen, which is at present not used to capacity, and leave the Olten–Rupperswil section free to carry east-west traffic. When the new works are complete Gotthard line freights will travel over a double-track route throughout from Basle to Chiasso. Much of the new signalling over the Gotthard line proper is already working, in particular the 13 block sections in the Gotthard tunnel. The other major civil engineering schemes at Brugg and Chiasso are in hand and should be completed by 1967.

## A 10-year motive power plan

The 10-year motive power modernisation programme, already well known, provides for the gradual replacement of older locomotives by the highly competent 6,000 h.p. Ae 6/6 Co-Co locomotives, introduced in 1952. Nearly 100 are now in service and another 50 are on order. When introduced, the Ae 6/6 locomotives could handle singly loads of up to 600 *tonnes* at speeds of 46 m.p.h. on the continuous 1 in 37 gradients of the Gotthard line, compared with 520 *tonnes* at 21–24 m.p.h. of the Be 6/8 "Crocodile" 1C-C1s of the 1920s.

Clearly the long-term measures for the relief of Gotthard line traffic congestion could not be achieved overnight. The Swiss Federal Railways therefore embarked on a reorganisation to improve operating techniques and make better use of existing facilities. Its foremost item was the establishment of a centralised traffic control and train supervision office; second there was the marshalling of as much freight as possible of a similar classification into block trains; third was the adaptation of running schedules of freight trains to suit the needs of forwarding agents and the customs authorities at Chiasso who handled the goods; finally, timetables were recast to increase line occupation The Swiss Federal Railways have also been negotiating with both the Italian Customs and the Italian State Railways in an endeavour to modify the complicated frontier formalities (which in their present form date from about 1880), and train formations.

The first traffic control office covering the Gotthard line was opened on a provisional basis at Erstfeld in August, 1956, but was moved to Lucerne in the following year. Subsequently other operating control offices were established at Lausanne (Region 1) and Zurich (Region 3). A headquarters control was opened at Berne in 1963 to co-ordinate the activities of the three Regional control offices. The control offices supervise only those lines carrying heavy traffic; Lucerne control office concentrates on the section from Rupperswil to Biasca, but subsidiary control offices at Olten and Bellinzona respectively supervise the sections from Basle to Aarburg and Olten to Brugg, and Biasca–Chiasso/Luino/Locarno. Thus the entire Gotthard freight route comes under the Region 2 offices.

The control office is divided into three sections: traffic control; train running supervision; and locomotive control. The traffic control section is responsible for planning the operation of each day's freight services. The plans are based on wagon reports received at set times from the principal marshalling yards along the Gotthard route and from the neighbouring railway networks (France, Germany and Italy) regarding traffic that will be running through Switzerland. The controller therefore knows the wagon position for about 8 to 20hrs in advance from his wagon summary sheets. There is a basic freight train timetable, but, as on British Railways, the controller will cancel a train where traffic is insufficient or improvise additional services to run in "when required" paths if traffic is heavy. Naturally, the traffic controllers work in concert with the locomotive controllers.

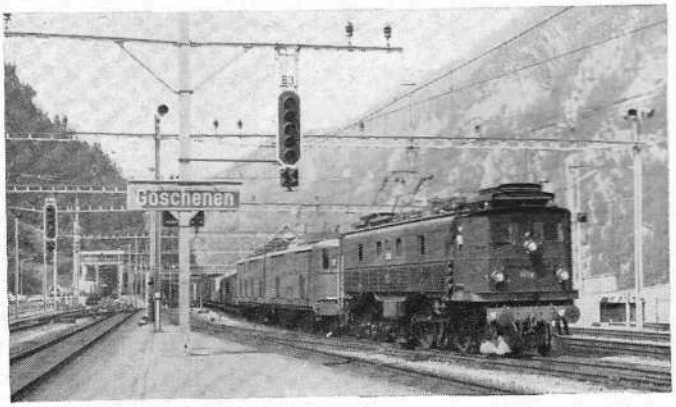
## Controls use graph methods

The controller estimates his train requirements and plans the day's freight services on train graphs, one each for Basle–Chiasso and Chiasso–Basle, which are pre-printed with the basic freight train paths. He confirms the trains which will actually run by re-tracing the selected basic train paths on each graph, in coded colours. On the Basle–Chiasso graph, for example, red indicates perishable and block trains undergoing customs formalities inside Italy; green denotes ordinary freight with customs formalities at Chiasso; and blue, empty wagon trains. On the northbound graph, red denotes TEEM (*see page 148*) perishable trains; black, ordinary trains; and yellow, booked trains that in fact are cancelled.

The supply of wagons for traffic loading at internal Swiss stations is dealt with by a wagon controller in another part of the control office and is separate from the traffic control section. Normally the Gotthard route is reserved for loaded trains. Empty wagons travel by the circuitous route through Lausanne, Brigue and the Simplon line to and from Milan.

Wagon movement reports and train composition reports are transmitted between the principal stations and yards and the traffic control office over a comprehensive teleprinter network. In addition, selected stations have direct, loudspeaker-equipped lines to the control office.

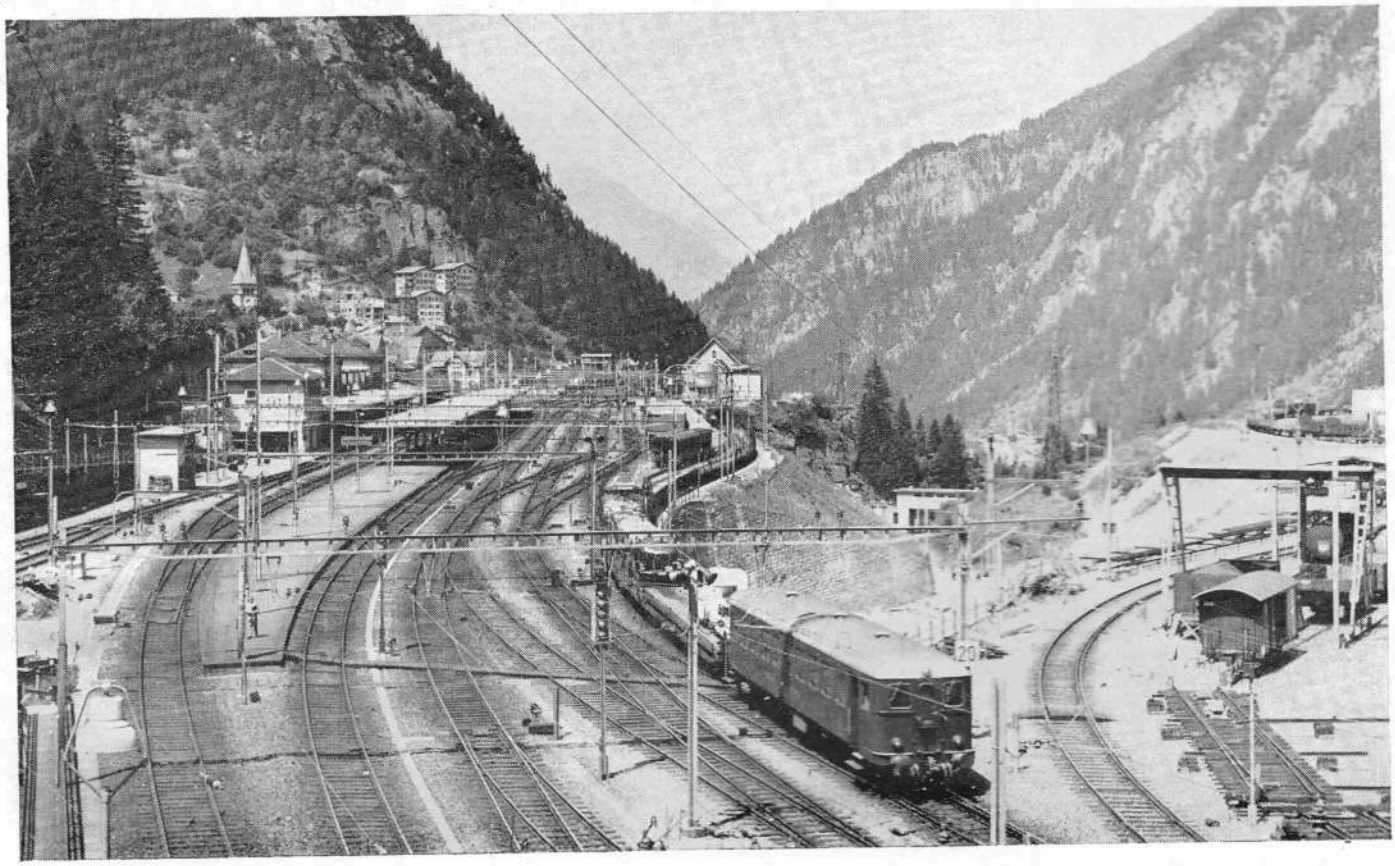
As on British Railways the traffic control section is also responsible for passenger traffic, the flows of which are usually more predictable than those of freight. Here, too, the teleprinter network is employed to arrange extra passenger trains or strengthen existing trains at short notice. Exceptional passenger movements—like, for example, the return of large numbers of Italian workers in Switzerland to their families for Christmas or for elections, or the influx of British school parties at Easter, which last year needed 107 special trains from the Channel ports to or via Switzerland between March 23 and April 18—are dealt with by the all-line control.




**Left:** A southbound Gotthard freight double-headed by a 2,040 h.p. 1B-B1 of Class Be6/8 and an 11,100 h.p. twin-unit locomotive of Class Ae8/14 surmounts the 1 in 37 climb of the northern ramp to the Gotthard Tunnel at Göschenen on June 18, 1964. *Photo by G. M. Kichenside*

**Below:** A general view of Göschenen station taken from above the northern entrance of the Gotthard Tunnel on June 18, 1964; the train in the foreground is one of the Göschenen-Airolo push-pull car-ferries, of which the locomotive is at the far end. *Photo by G. M. Kichenside*

**Facing page:** Two Class Ae6/6 locomotives, Nos. 11413 *Schaffhausen* and 11431 *Sarnen*, approach Göschenen with the 12.41 Basle–Chiasso on August 14, 1964.
*Photo by Brian Stephenson*



The train supervision office, as its name implies, is responsible for the control of trains on the line. The Lucerne train supervision office is divided into two sections, one covering the line from Rupperswil to Arth Goldau, the other from Arth Goldau to Biasca. As I have already mentioned, subsidiary control offices at Olten and Bellinzona supervise the line between Basle and Rupperswil, and Biasca and Chiasso/Luino/Locarno. Ultimately these subsidiary offices will be centralised in new offices planned at Lucerne to replace the present rather cramped accommodation of the Lucerne control.

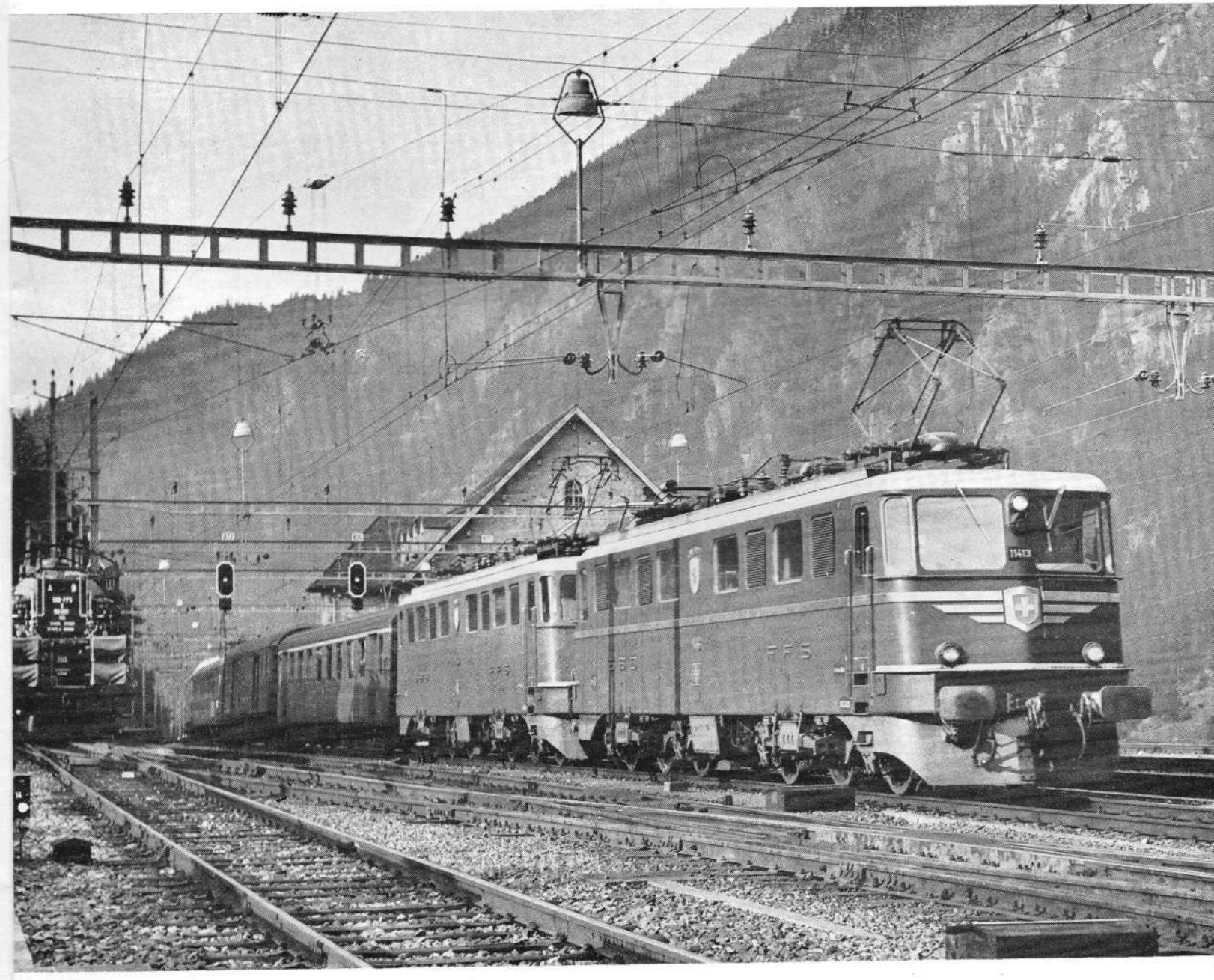
The train controller compiles a train graph of the day's operations, based on reports from principal stations. This graph also employs colour coding, which has the same connotation in both directions: red, passenger; blue, freight and light engines; yellow, cancelled; and brown, "when required" trains that are actually run. The controller is responsible for regulation to ensure that important trains, such as TEEs, are not delayed. The controller must keep a close watch on freight traffic entering and leaving Switzerland at Basle and Chiasso and take steps to overcome any delays at the frontier by arranging for following freight trains to be stabled in station loops to keep the running lines clear.

One of the tasks undertaken by the traffic control office is the planning of special measures to avoid or ease congestion, particularly where recurring traffic patterns show that timetable alterations are needed. While the operators would naturally like to use all the timetabled paths available over the Gotthard line, the intensive service, rapid acceleration and continuous braking of trains on the falling grades inevitably build up conditions that necessitate constant maintenance of the fixed structures. Any timetable alterations have to take careful account of the intervals needed for attention to track and overhead equipment. Although the programme of engineering works is not known in detail when the timetable is planned, a reserve of time is built into it to allow for such contingencies as permanent-way slacks or even short stretches of single-line working and to avoid risk of a traffic blockage. Since nearly all Swiss stations have both facing and trailing crossovers, single-line working causes little delay by comparison with the time-consuming reversing movements necessary on BR.

Switzerland is a tri-lingual country and Swiss Federal staff must be able to converse with their colleagues in other parts of the system where the language is different. At Lucerne this means that the normally German-speaking staff have to be able to talk in Italian with staff south of the Gotthard tunnel in Canton Ticino.

## Customs simple for block trains

The opening of part of the new yard with temporary accommodation at Chiasso has meant that more trains can now be held to await Customs clearance at Chiasso itself



A block perishables train from Italy descends the northern ramp of the Gotthard line below Wassen on August 15, 1964 behind Class Ae6/6 locomotive No. 11488.
*Photo by Brian Stephenson*

instead of being stabled at intermediate stations. Other operating measures, however, have also helped to speed north-south traffic. Most important is the organisation of block trains; second is a modification of Italian Customs formalities at Chiasso and elsewhere in respect of block loads of similar traffic. Block trains are not necessarily confined to the traffic of one consignor to one consignee, but may be made up of wagons from different starting stations to a variety of destinations solely to qualify for simplified Customs procedure. Some block trains are formed at one of the Basle marshalling yards or, if the traffic is suitable, at internal French or German yards for through runs to Italian destinations. The advantage of block loads is that the Italian Customs authorities agree to give the train as a whole only a cursory examination at Chiasso, instead of the detailed procedure inflicted on individual consignments, though it is essential that the wagon documents arrive at Chiasso before the train. A block train can usually be cleared in this way in about 3hr instead of the 24hr or so needed to examine single wagonloads, which may have to be unloaded for a thorough examination. Even then the documents must arrive at Chiasso before the wagon. Before the introduction of block trains, consignments often took 72hr to pass through Italian frontier formalities.

## *Traffic fluctuates daily*

The most common type of block train is one made up of wagons containing similar items of general goods, refrigerated perishables and such bulk traffic as coal and cement. The detailed examination of block loads depends on where the Customs duty is paid—at Chiasso or at an internal Customs clearance station in Italy, which is determined by the consignor. Inevitably with such a complex procedure there is a great deal of paper work, most of which is handled by firms specialising in merchandise transhipment. Ordinary wagons are consigned to a transit firm at Chiasso, which carries out the further documentation necessary to pass each wagon on to its consignee. When block trains are to be cleared at an internal Customs post instead of at Chiasso, the train is consigned to a transit firm at the relevant examination point in Italy.

Traffic from the north at weekends must be carefully regulated, since the Italian Customs authorities do not work on Sundays, except to clear perishable traffic. Other merchandise arriving at Basle late on Saturdays or during Sunday is therefore held until Monday morning at Basle or, if there is sufficient room, at the yards along the Gotthard route.

There are considerable daily fluctuations in the amount of traffic passing over the Gotthard and for most of the year southbound traffic is heavier than northbound. During July and August, however, when Italian produce exports reach their peak, the north and southbound flows are about equal. Variations in Italian food exports are reflected in the number of perishable wagons entering Switzerland at Chiasso; in 1963, for example, the total for August alone was 17,678, but in November was no more than 3,025. Of the year's total of 101,113 northbound perishable wagons, 16 per cent were destined to or via the SNCF at Basle, 65 per cent to or via the DB at Basle Badischer and 16 per cent to or via the DB through Schaffhausen; the balance was bound for internal Swiss stations. The increase in the volume of freight passing in both directions over the Gotthard can be gauged by a comparison of the day-to-day gross tonnage figures for 1956, 1960 and 1963. (*see table at foot of page.*)

This volume of traffic demanded an increase both in the number of trains run and also of individual train weights. As built, the Class Ae 6/6 Co-Co locomotives were allowed to take 600*tonnes* over the Gotthard single-handed, but recent design improvements to such items as the traction motor cooling system have allowed the limit for one Ae 6/6 locomotive to be raised to 650*tonnes*. The maximum train weight with double-heading up the steepest sections from Erstfeld to Göschenen and Bellinzona to Airolo is normally 900*tonnes* because of drawbar limitations, but *Trans-Europ Express Marchandises* (TEEM) trains, which are composed of wagons with roller bearings and improved drawbars, may load to 1,000*tonnes*. Certain ordinary freights are authorised to load up to 1,600*tonnes* with three locomotives, but because of the 900*tonne* drawbar limit the locomotives must be distributed through the train, as follows:

Ae 6/6 + 700*tonnes* + Ae 6/6 + Ae 6/6 + 900*tonnes;* or
Ae 6/6 + Ae 6/6 + 900*tonnes* + Ae 6/6 + 700*tonnes*.

This practice is not often employed because of the excessive train length. The Class Ae 6/6 locomotives cannot work in multiple and each must have its own driver.

Train regulation has also been improved in other ways—for example, by the introduction of speed-regulation signalling boards. These are employed at stations to inform drivers of non-stopping trains whether they are required to reduce, increase or maintain speed, particularly if they are late. The

**Gotthard line—Erstfeld—Göschenen and Bellinzona (both directions). Number of days in year on which gross tonnages shown were carried**

| Gross tonnes | 40,000–44,999 | 45,000–49,999 | 50,000–54,999 | 55,000–59,999 | 60,000–64,999 | 65,000–69,999 | 70,000–74,999 | 75,000–79,999 |
|---|---|---|---|---|---|---|---|---|
| 1956 | 26 | 1 | — | — | — | — | — | — |
| 1960 | 41 | 80 | 121 | 56 | 4 | — | — | — |
| 1963 | 45 | 34 | 40 | 80 | 70 | 52 | 28 | — |

appropriate side of the board, which has a black "V" chevron on one side and horizontal black line on the other, is displayed to an approaching train by the *sous chef* on the instructions of the control office. Where a late-running train conflicts with another train at a junction, further delays may be lessened if the late train is slowed down but kept moving, instead of continuing at normal speed until stopped at the junction. Equally, a late train running at normal speed to maintain sectional times may clear the junction without delaying the conflicting train if it increases speed to the maximum permitted.

## *Trains are radio-equipped*

Since last summer, freight train conductors on the Gotthard line have been provided with two-way radio-telephone equipment with a range of about 3km. This allows them to talk directly to the nearest station *sous-chef* while the train is on the move. Principal stations between Erstfeld and Chiasso now have receiving and transmitting equipment, so that, except in tunnels, train conductors are rarely out of radio contact with a station. The radio is used to pass operational information, to advise of train defects like a hot axlebox which may be noticed by a *sous chef* on a passing train, or for assistance calls by the conductor in the case of accident or failure. The introduction of radio equipment means that only one conductor is required on each freight train instead of two formerly needed on the mountain sections. It is of interest that on the SFR certain freight trains of up to 40 axles (30 axles on the Gotthard line) may be worked without a conductor and with only one man on the locomotive.

Centralised train and traffic supervision has been of the utmost importance in coping with the remarkable traffic increase over this important rail link. The gradual completion of the Gotthard route's civil engineering projects over the next three years will enlarge capacity, but if the traffic increase continues at its present rate even more drastic steps will be needed. Already plans are under discussion for the development of other existing routes. Among these are the doubling throughout of the Lötschberg line or even the construction of another Gotthard tunnel, 28 miles long, at a lower level.

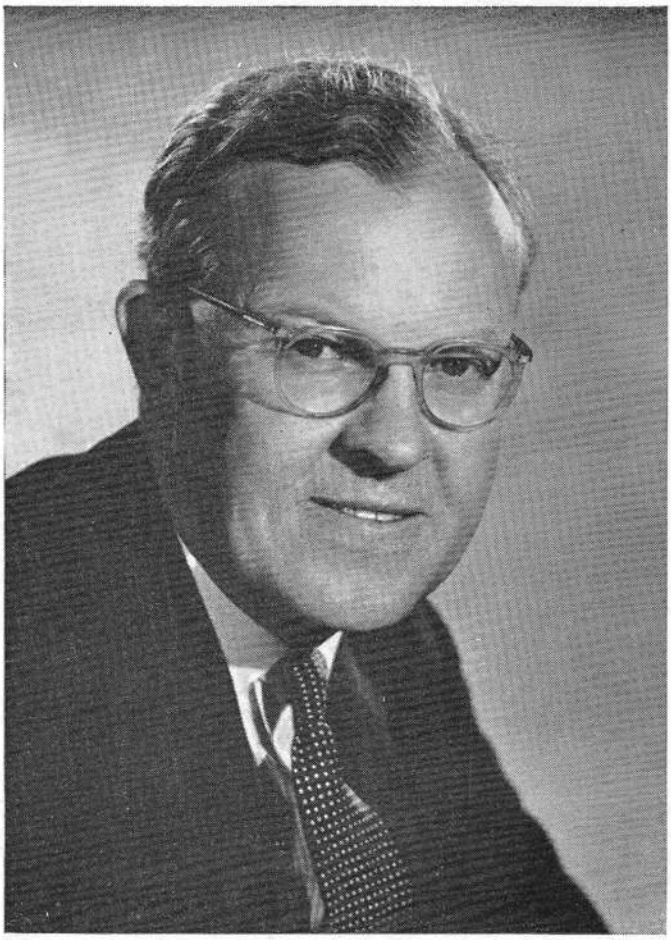
# LIVERPOOL–SOUTHPORT ELECTRICS REPRIEVED

THE Merseyside public might have breathed sighs of relief at the recent announcement that the Liverpool–Southport electric services were going to be spared for the moment, but the Beeching sword, many feel, has been sheathed only temporarily. It has been remarked with dismay that no great fanfare of trumpets, no great publicity drive, accompanied the announcement. Another blow to the 120,000 weekly users was an increase in fares of roughly 8 per cent from February 1. Consequently the numbers travelling to work on Merseyside have dwindled and more private car "combines" have added traffic to the choked streets of Liverpool at the peak hours.

But the line, essentially modern enough for the threat of closure to arouse total bewilderment among locals, can play an exciting role in plans being discussed on Merseyside by several public bodies for the integration of its traffic flows. This proposal was almost certainly raised at a recent meeting, held in private, of the Steering Committee on Merseyside Traffic & Transport, which includes local authority representation, as well as delegations from transport and harbour bodies.

One of the ideas set out in a report before the meeting, held on January 15, was the possible blending of the Liverpool–Southport line with the Merseyside electric services, the ultimate aim of which merger would mean through trains from Crossens or Southport to West Kirby, on the far side of the Wirral. In the September, 1964 MODERN RAILWAYS Mr. H. A. Mugliston, BR's Liverpool area Divisional Manager, indicated that the link—a spur from near Exchange Station—would mean that Southport passengers could be transported to within 5min walk of city centre amenities. To be borne in mind, too, is the fact that Liverpool Corporation plan eventually to make the City centre a pedestrian precinct.

The 18.10 to Southport and 18.15 to Ormskirk await departure at Liverpool Exchange on October 24, 1964 *Photo by J. Clarke*



# Outlook for th

The proposed Bournemouth electric service will match all forseeable traffic demands, claims Mr David McKenna, Chairman and General Manager of the Southern Region, in this discussion on the likely future trends of SR passenger traffic and rolling stock with G. Freeman Allen

**Left:** Mr. David McKenna.
**Below:** The concourse at Victoria, London.
*Photo by C. T. Gifford*

# he Southern's passengers

**Allen:** Now that you've transferred all territory west of Salisbury to the Western Region, to me the Southern looks even more like a railway whose primary job is just to move commuters into and out of London, for most of the year anyway. We are frequently told that commuters aren't the most profitable form of traffic. If that is true, how can the Southern ever pay its way?

**McKenna:** The secret of making commuter traffic pay its way (and I must admit that the Southern Region does not yet meet all its financial obligations) lies really in the degree of overcrowding that is tolerable. It's as simple as that—how many people one can get into the stock one has to provide just for the sake of the peak movements.

## Suburban stock design is right

**Allen:** Do you think that the limit of people you can squeeze into your trains has been reached? Or do you foresee any fresh developments in high-density suburban stock—less conventional seating, perhaps, and more standing room or perhaps some unconventional seating after the fashion of shooting sticks, which would take up less space?

**McKenna:** No. I think we have already arrived at a fairly good compromise. If you wanted to maximise capacity without any regard for comfort you wouldn't have any seats at all. You could provide the equivalent of cattle trucks, but that would be, I think, a totally unacceptable solution, particularly in the periods outside the peaks, as it would be uneconomic to segregate peak and non-peak stock, since you couldn't then get a proper rotation of vehicles for maintenance. You might have to adopt a totally different system of maintenance, which I think would be a more expensive one than we have now.

Over the years—and it's taken long enough—I think we have arrived at the right balance between seats and reasonable provision for standing. What has now come to be our standard suburban design of the open saloon type, with three-and-two seating separated by a central gangway and a multiplicity of doors, is a very efficient vehicle from the viewpoint of maximum capacity, or near-maximum capacity. It offers a reasonable degree of comfort in the peaks and a great deal more outside the peaks. Moreover, there is room to circulate inside the car, which is important so that passengers can sort themselves out —and, curiously enough, the luggage racks over the seats form very useful hand-holds. I don't see any fundamentally different approach which is likely to produce a better answer.

**Allen:** Nevertheless, it is true to say that metropolitan railways in other parts of Europe tend now to provide fewer seats and more standing room. On most of your suburban services, I would have thought, the very ample seating is by no means fully occupied in the off-peak. Isn't there a case for providing slightly fewer seats so that you will have more and less cramped standing room in the peaks, without this handicap you fear of having to segregate off-peak and peak stock?

**McKenna:** Go more for the London Transport pattern, you mean? But our length of journey is rather longer than those of true metropolitan railways. We are catering for journeys of half hour-plus length. In that situation, if we can provide a good many people with seats without too much sacrifice of standing space, well and good.

## Stagger will not solve peak problem

**Allen:** Have your efforts to spread the London peak or encourage the dispersal of offices to the suburbs and beyond had any significant success? Are the restrictions that are now being placed on new office building going to stop the continuing growth of your peak traffic? In other words, are you going to get away without having to enlarge or improve your facilities in the London suburban area?

**McKenna:** You raise two separate questions here. First, there is staggering in time. I don't think that would ever do more than give local relief for a small number of people; insofar as it does that, it could be very useful, but it won't fundamentally alter the characteristics of our peak. Your second point is staggering in space—a different distribution of workers—which I think is absolutely the right policy to aim at. As yet it's a fairly new policy and it is far too early to say whether it is going to be successful. But it is worth making tremendous efforts to propagate it.

**Allen:** So far as the Southern is concerned, might these efforts go as far as really worthwhile financial inducements? I believe you offer an advice service to firms who are thinking of moving out of London, to point out the suburban railheads from which they can get a good service into town. But what about offering them substantially cheaper travel rates for business travel from suburban offices to the centre of London and back again in the off-peak? Or even cheaper peak rates for those of their staff who are moving in the opposite direction to the main peak flow?

**McKenna:** So far as off-peak travel is concerned, these people can cash in on our general system of off-peak cheap tickets, but I don't think that the railways should really be the leaders in determining the distribution of work places. I think, though, that they can play their part. As for advice from our side, I think it matters very much that the decentralised office should sit right on top of trunk communications; if getting to it involves another subsidiary journey, half the attraction of getting one's office outside the city centre disappears.

## Train service will be flexible

**Allen:** You say the railways shouldn't be a leader. But surely it is to your considerable financial benefit to get as much decentralisation as possible to control your peak traffic and help balance the inward and outward flows?

**McKenna:** If we could see our way clearly to achievement of a completely altered pattern of home and work places and if we had power to ensure that it could be carried out, then I would agree with you. But we aren't in that position and all we can do is to try persuasion. I think the other factors in the equation can operate more powerfully than any sort of financial inducement by way of fares.

**Allen:** How far are you being frustrated by developments like the LCC Woolwich Arsenal housing programme?

**McKenna:** It depends how it works out. If it is merely going to be another dormitory for workers in the centre of London, it would be very sad. But if it is going to house people working either in that neighbourhood or even further away, say in the Medway area, then that is all right. Personally, I would rather see a bolder overspill programme taking people right outside and beyond what used to be called the satellite belt, so that the pull of the centre gets less and less powerful. I think the right answer is the establishment of new communities at about 70 miles distance rather than 25.

**Allen:** Supposing new communities are established 70 miles out and a great deal of commerce moves beyond the satellite belt, do you foresee the need of any new lateral train services in the SR? Have you, indeed, any new services of this kind tentatively drafted?

**McKenna:** At the moment, no. It depends where the new communities are. We already have a very good coastal line of communication and if there is development of points along the coast, the framework of a suitable service is ready-made. When we have exclusively modern traction and all our main routes are electric, then we shall have a flexible railway which can put on the required services at will with relatively small expense. But the new communities must be planned in proper relationship to the railway network. It is absolutely essential that there should be the fullest consultation with the transport authorities in the early stages, before the decisions are taken exactly where the new communities are going to be.

**Allen:** You are implying that this doesn't exist to any great extent at the moment?

**McKenna:** It is coming. There is a much greater realisation of its importance than there was, say, 10 years ago.

**Allen:** Have you any fundamental alterations of London's passenger facilities in mind? For example, when London Bridge is rebuilt, do you contemplate four-tracking the southern side of the Borough Market triangle, or some sort of modification of the London Railway Plan of 1944?

**McKenna:** I don't think we shall go back to something like the London Plan of 1944. If we are forced to provide extra capacity through failure to decentralise London's population, it's much more probable that we shall do some rearrangement of the trackwork in the Borough Market neighbourhood, rather than adopt a completely new approach, like putting the whole thing underground, with through journeys across the river. The expense of that is out of all proportion to the benefits it would confer.

## Are cross-London services feasible?

**Allen:** Is there any fresh thought of direct connections between the Southern and main lines north of the Thames, such as a through service via Blackfriars to an Eastern Region trunk express railhead at, say, Hitchin; or a revival of a West London line service? A MODERN RAILWAYS correspondent has recently made a case for a morning and evening express service between Clapham Junction and the North-West, for example.

**McKenna:** I would never rule out anything like that. But, in practice, through services across London aren't particularly attractive because you deny yourself your recovery time in the terminal, and it means that any upset on one side of London is imported into the whole system on the other side. A limited working from the south just up to the edge of the built-up area of the north with some kind of terminal operation, so that there is opportunity for recovery, would get over the difficulty, but not trains shuttling across the centre of London from, say, 30 miles out on one side to 30 miles out on the other. There is another problem: that if the traffic isn't heavy by our standards, the provision we can reasonably make is not very frequent and then it loses its attraction.

**Allen:** You were talking earlier of a future situation in which your approach to timetabling will be flexible and you will put on new trains at comparatively short notice. Does this mean that a time is coming when the Southern timetable will not be immutable for years on end and when it will be adapted more rapidly to changing travel trends?

**McKenna:** I would hope so—mind you, I don't know that I accept that trends change all that rapidly. I think there has been a certain stickiness about the general pattern of residence and work place in this particular corner of England for a very long time. Only now are we asking ourselves whether we must go on accepting this basic pattern.

## "Salisbury isn't our main line now"

**Allen:** To turn to the Bournemouth electrification, I'm delighted that it is going ahead. But I'm disappointed over two things, and the first is that Salisbury is not included.

**McKenna:** Our difficulty about Salisbury is that it isn't our main line now. Our real centres of activity are Southampton and Bournemouth. Salisbury is a nice, pleasant country town about at the fringe of the commuter area. We could have said we will throw in electrification to Salisbury, but at the moment it wouldn't be the right thing to do because we are not in a position to throw anything in. We are not a viable Region financially. For the present we can serve Salisbury well with diesel traction consistent with electrification on what I now call our main line—but I'm not saying that this is the end of the road.

**Allen:** My other complaint is that the service you propose looks a little timid by comparison with the kind of frequency that the Southern Railway used to offer after electrification to maximise the appeal and the potential of electric traction, particularly for off-peak services. I have the projected development of Southampton especially in mind. Is this fair criticism?

**McKenna:** No, I don't think so. We won't have filled up the timetable by any means. Nothing will prevent us expanding it later. It is ahead of what we have now in speed and frequency; it will be ahead of any substantial development of population and activity in the area served; and I think we can keep it ahead. Without being wasteful, we have pitched the service at the right level to encourage further development, but we shall not get overtaken by it.

**Allen:** Surely if you are only providing yourself with just enough stock to maintain the initial service, there is going to be a considerable delay before you can increase it?

**McKenna:** No, not at all. The initial capacity we have planned leaves us quite enough elbow room to absorb any rising demand while we order and get new stock manufactured.

**Allen:** You claim that the initial Bournemouth line electric service will be on a par with what was offered after the Brighton electrification, for example?

**McKenna:** In relation to the distance and the nature of the two

A Victoria–Brighton electric multiple-unit stopping train approaches Clapham Junction on the Central Division main line as "West Country" Class 4-6-2 No. 34094 *Mortehoe* heads up the South Western Division main line with a semi-fast from Basingstoke. *Photo by C. T. Gifford*

communities, yes. It's further from Southampton to London than from Brighton. I would say that Southampton is likely to become a self-contained community to a rather greater extent than Brighton.

## New stock "not spectacular"

**Allen:** There's been some misgiving, too, that the Bournemouth electric stock will be largely rebuilt from existing vehicles. Was this forced on you to keep the cost down? Will the interior be up to the best modern standards—will it reproduce XP64 design, for example?

**McKenna:** No, it won't be an XP64-type interior design, although it will have some—perhaps the less spectacular—features of XP64, such as the very carefully worked-out seat profiles. The facts of life are that British Railways have got a lot of reasonably modern coaching stock and that the bones of the stock—the underframes and the shell—are very good; we can't afford to waste them. There will have to be a certain amount of rebuilding of ends to fit them for Southern multiple-unit operation. There will be new bogies to improve the riding and the interiors will be refurnished in accordance with our latest ideas on plastic panelling, lighting and so on. Put it this way: it won't be spectacular stock, but it will be thoroughly good-looking like our new Brighton stock; that isn't spectacular either, but I think that when people see it they realise how much trouble has been taken over the design and the features that really matter.

**Allen:** Don't you think that the public is going to be a little puzzled that a little while ago XP64 was being publicised as the standard BR coach design of the future, that a new corporate identity programme has just been launched to emphasise that British Railways is a unified concern, and yet here is the Southern to all intents and purposes going its own design way over the new Bournemouth stock?

**McKenna:** No, I disagree that the Southern is going its own way and spoiling the image. The Southern is part of British Railways, but the characteristics of the Southern, of its traffic and of the nature of its passenger journeys are a little bit different from a great deal of the rest of BR. XP64 is primarily designed for much longer-distance travel. Where we can fit in with standards that have really been designed for another purpose, we do fit in. You can't impose—and it wouldn't be right to impose—a policy of rigid standardisation where situations are so different.

## No point in changing what is good

**Allen:** At least XP64 looks patently like a step forward. There's a widespread belief that change on the Southern, except in engineering, grinds very slowly. The timetable has been static for a long, long time; speeds on a line like the Brighton are still the same as they were when it was electrified; and there seems little immediate prospect of these being improved. One gets the impression that, so far as the stock is concerned, in basic essentials you feel that what was good for the 1930s is good for the 1960s—and even for the 1980s, as you've just built new Brighton stock that is going to last for at least 20 years—while all around you the tempo, the exterior forms and the interior styling of other forms of travel are changing.

**McKenna:** Not always for the better. Appearance is a reflection partly of basic design and partly of more transient features of fashion. We concentrate on the fundamental design features, and if we have something which is good, there is no point in changing it unless we can produce something which is essentially better. We will do what we can with the other, but it is much more important to provide stock that is comfortable, that does its job and that wears well, than stock which reflects all the latest fashion and in five years time looks as dead as a dodo.

**Allen:** That seems to suggest that you are expecting to retain your traffic or attract new traffic with the same selling-points as the railway was offering in the 1940s—even as far back as the late 1930s: or, alternatively, that any new traffic will come to you largely by default of other forms of transport—for example, the increasing costs of motoring and parking.

**McKenna:** Certainly not. Transport is fundamentally getting from one place to another. Therefore the primary feature that sells one transport medium is whether it gets you from place to place in a more attractive way than some other form. The fundamental sales points of our Bournemouth electrification will be speed and frequency. Allied to that we want it to be comfortable and quiet and I think we shall succeed in both respects with continuously welded rail all the way on the fast line from London to Bournemouth. It is after these considerations that we come to what I would call the subsidiary points of rolling stock design; they are very important, but they are not the controlling points in selling the service. Mind you, I'm not saying that the Bournemouth coaches will be unattractive. The fundamental design will be good; they will be well lit; they will be clean; and they will be comfortable. The only thing which you might say is missing is the veneer of transient fashion.

## "Pub" catering suits the SR

**Allen:** What about refreshment facilities, which have disappeared from many of your services altogether and which are to be downgraded from restaurant car status to buffets exclusively in your new Bournemouth stock—are these no longer as important a selling-point of rail travel in your view?

**McKenna:** They are getting less important because the duration of the journey is getting shorter. On the Southern I think we are absolutely right to go over to what I would call mobile pub catering rather than sit-down, knife-and-fork meals. I think there is still a good way to go. I don't think we've been as clever as we might have been in making buffet-type catering attractive, but I think the fundamental approach is right.

**Allen:** I've heard chronic complaints, particularly from commuters in the Winchester area, about the reliability of the present Bournemouth service. Is your steam power going to hold out until 1967?

**McKenna:** Yes.

**Allen:** Your fingers, I see, are firmly crossed. The prospects are dicey, are they?

**McKenna:** Yes, we are going to need a lot of hard work by a lot of people.

**Allen:** There is no possible chance of any transfer of diesel locomotives from anywhere else to help you out?

**McKenna:** At the moment, no; we're trying hard, but other people are in the same boat. We tried to borrow a class of steam engines—you don't want individual ones; that isn't any use—that would give us a little more in hand, but we found no class available in a block that was suitable. We looked at the Stanier "Duchess" locomotives, but they infringed clearances that it was uneconomic to modify. Life is always difficult when you're coming to the end of a running-down period. And it's a paradox that the Southern, which has always been in the van of modernisation and electrification, will be the last Region to have steam. We are jumping to electrification for our remaining main line and it is not worth having an interim period of dieselisation, so we have to take the dirty end of a very carefully planned run-down of steam power.

## Cross-Channel de luxe traffic lost

**Allen:** Have you resigned yourself to virtually commuter standards of cross-Channel passenger operation? Has de luxe travel been lost irrevocably to the airlines, or to motorists travelling with their cars, so that the "Golden Arrow" and the "Night Ferry" are doomed to slow extinction?

**McKenna:** The very short answer is yes. I think the great bulk of de luxe travel no longer goes by surface and will not do so again. Our policy of a basically non-de luxe level of travel with just a little premium accommodation must be the right thing in our particular market.

**Allen:** Will a Channel Tunnel and the attraction of an all-the-way train service in a reduced time make any difference to your potential market?

**McKenna:** Very much so. We should then become a very serious competitor to the airlines for the de luxe trade, because of the terminal factor. The railway terminals at both ends are much more conveniently situated for anyone bound for London or Paris than the airports, which involve this tiresome business of getting between them and the city centres.

**Allen:** Do you think that there will be services to provincial centres in this country direct from the Channel Tunnel, and conversely through to a number of cities on the Continent?

**Concluded on page 165**

*"Systematic neglect" is how some critics regard the upkeep of SR electric m.u. traction gear. But a deliberate policy of sparing attention has kept costs down and performance of inherently robust equipment high, as P. Perry, the SR's Traction Planning Assistant, explained in a recent paper to the Institution of Locomotive Engineers, which we have summarised.*

# How the Southern's electric

THE Southern Region operates some 4,400 electric multiple-unit vehicles, of which approximately half are motor-coaches and half trailers, including driving trailers. They range over some 1,700 route miles of electrified track and are berthed overnight at 85 points throughout the Region.

No unit has a home depot. All stock is common user and its maintenance can be carried out at any one of five depots. With the complex suburban system operating in the Region, some occasional mishaps result in disruption of normal working. In these circumstances there must be no restriction on the Traffic Department's freedom to do whatever the circumstances dictate. It is to this end that the system is consciously designed—although the stock working is adhered to as closely as possible, of course.

With so much berthing away from maintenance depots, the stock working must be designed to permit each unit to travel via a depot at reasonably short and regular intervals. Three days are taken as the generally desirable period. Of the 3,600 or so coaches which are required daily for traffic, 1,200 or so are berthed during some part of the 24hr adjacent to an Inspection Shed.

As most of the stock is maintained at more than two places, it is obviously necessary to co-ordinate the work of the various depots. This is one of the functions of the Central Records Office. Here, detailed records of each unit are maintained, including such items as the wheel and axle records, details of lifting of the various coaches, traction motor case and armature numbers, etc. Individual item records are kept on separate cards and there is a pack of cards for each four-car unit. To trace the location of individual items, record books are maintained for such things as traction motor cases and armatures, etc. A number of attempts have been made to simplify and reduce the sheer volume of records kept, but as yet no improvement has resulted. The Records Office also keeps detailed records of routine work done, such as axle oiling, motor oiling, "shedding" (i.e. periodic equipment examination), etc., and periodically circularises inspection sheds with the numbers of units outstanding for classified attention. Telephoned advice is exchanged with each depot twice daily in order to maintain records currently.

"Maintenance" within the context of this paper covers two broad subdivisions of mechanical and electrical work, which can be defined as running maintenance and mechanical general overhaul. This work is sub-divided as follows:

- **C.M. & E.E. Department**
  - London Bridge office
    - Running maintenance
    - Mechanical general overhaul
  - Stewarts Lane office
    - C. & W. running maintenance and varnishing
- **Workshops** ... ... ...
  - 2½- and 7½-yearly body overhaul

## SR m.us. need 1m brake blocks a year

Running maintenance is covered in 13 depots. The approach is based on a combination of "on condition" requirements and time intervals. The "on condition" term applies to brake blocks, which are a major item of expenditure. During 1963, about 1m brake blocks were used, to a total purchase price of about £270,000. The effects on the motors and control equipment are occasionally appreciable. Experience shows that the usage of the multiple-units, even within a given type, is so variable that fixed periods for brake block renewal cannot be specified. Renewal is therefore based on inspections carried out as frequently as possible and on a system of indicating units which require brake block attention by the attachment of a distinctively coloured card; this means that the unit must be worked to a maintenance depot within 48hr. Co-operation is needed between the out-station examiners and the Traffic Department staff to achieve this. Units found in need of brake block renewals within a depot are dealt with there.

The remaining routine maintenance tasks are done on a periodic basis and comprise:

Axle oiling ... ... *monthly*

Equipment examination:
- *monthly* for e.m. equipment (almost extinct)
- 3-*monthly* for 1936-type stock
- 4½-*monthly* for 1951- and 1957-type stock

The 1936-type stock has an electro-pneumatic contactor controlled equipment with totally enclosed motors. Lighting is series-connected to the 750V line in the suburban stock and parallel-connected to a motor-generator set on the express stock. The 4½-monthly examinations apply to two types. One of these is known as the 1951-type stock and comprises an e.p. contactor controlled equipment with self-ventilated motors. Lighting is parallel-connected from a motor-generator set. The second of these is the 1957-type stock and comprises a camshaft-controlled equipment with self-ventilated motors. Lighting is parallel-connected from a motor-generator set.

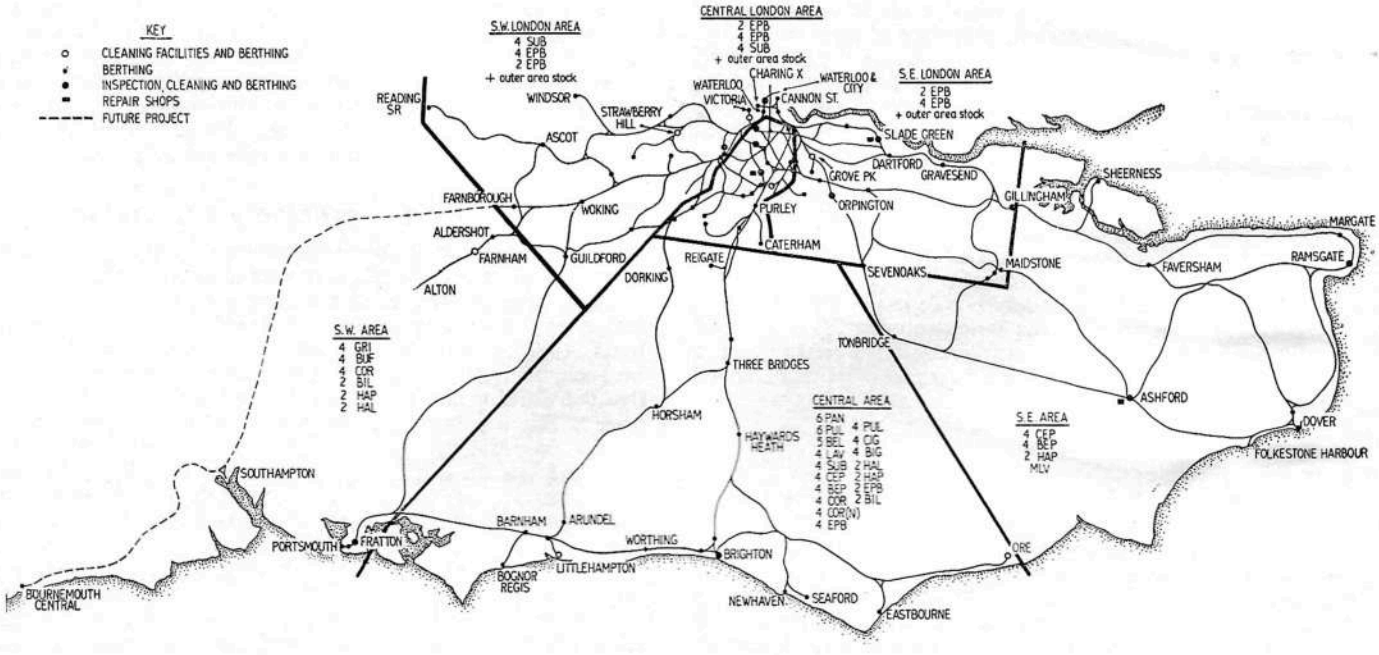
## Maintenance schedules are aides-memoire

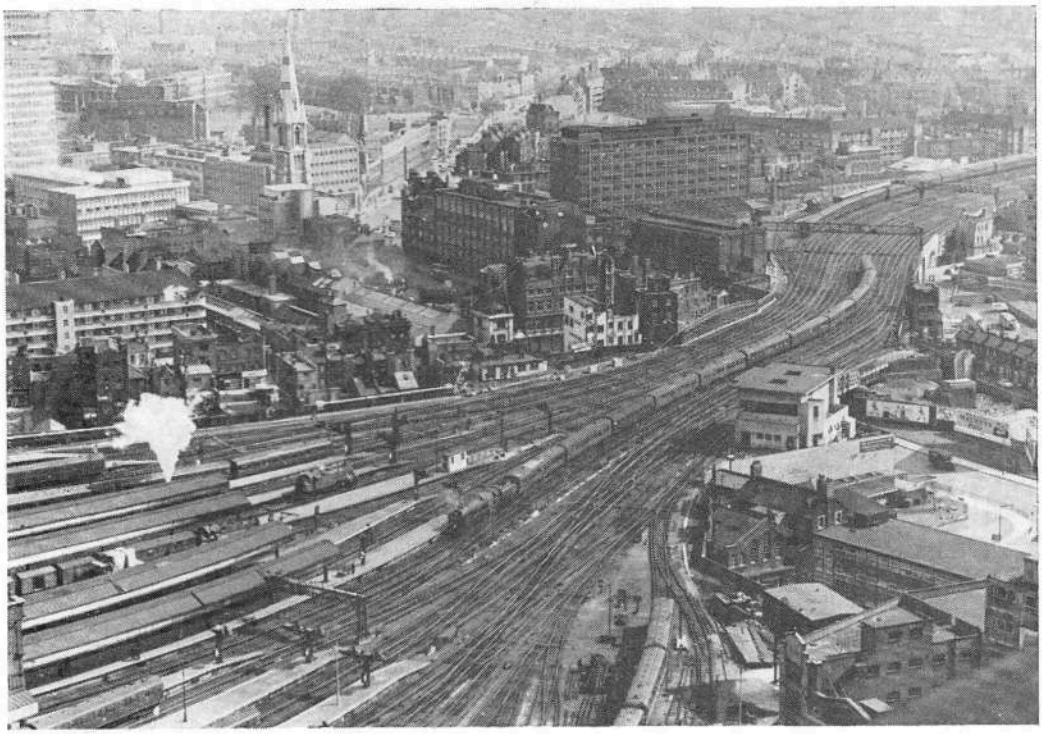
The examinations to be carried out are listed in the maintenance schedule. This is set out in sections, each section corresponding to the type of work to be done, i.e. brake

**Above:** A 4-EPB electric multiple-unit emerges from Crystal Palace Tunnel on the 13.10 Victoria–Blackfriars service via West Croydon and Wimbledon on July 5, 1964.
*Photo by Brian Stephenson*

**Facing page:** The 9.18 Victoria–Portsmouth Harbour, formed of a 4-CEP stock, leaves Dorking North on August 8, 1964.
*Photo by J. Scrace*

# multiple-units are maintained





Electric multiple-unit berthing sidings are visible in the top and bottom right-hand corners of this view of Waterloo Station approaches taken from the top of the Shell building. A "Merchant Navy" Class Pacific enters the terminus with an up express.
*Photo by R. Jackson*

blocking, axle oiling, equipment examination, etc. The maintenance schedule has been deliberately set out to provide a list only of jobs to be done and makes no attempt whatsoever to describe how they should be done. This approach was adopted because it was felt that prime need of the maintenance staff was a reminder and that once the detailed way of carrying out a job was understood, further reminders in this respect were unnecessary. The maintenance schedule was therefore produced in sufficiently small size to go in the pocket and was issued to all staff who are called on to do or to supervise the work.

The maintenance schedule for a new type of equipment would be produced based partly on makers' recommendations (usually none too convenient a guide), partly on experience of similar equipment and partly on convenient time or mileage intervals. Ideally, it should be available before the arrival of the new equipment. The schedule is then used for a trial period of a year or so and a close watch is kept on the reaction of the equipment. At the end of this period it should be possible to produce a revised and firm schedule. Further revisions will certainly be necessary as fresh experience is gained, but a distinction is drawn between giving the staff reasonably clear, concise, neat and easily-kept instructions and forcing them to deal with a handful of loose foolscap sheets. This approach covers equipment for examination at relatively short periods, i.e. general and comparatively superficial examinations. Whenever amplification of explanation or variation of a maintenance schedule item is considered necessary this is done in the form of a separate instruction, known as a Service Bulletin, which sets out the detailed way in which work is to be done, safety ensured, etc.

Detailed work study investigations of the depots showed that a job with a common nominal description at all depots was carried out differently by different depots in varying times. This is undesirable, so a further basic document is used, called a Work Specification. This defines precisely the tools required for the job and what is to be done and contains quite a detailed description.

## Electrical equipment needs little attention

It is a long-standing Southern Region practice that little attention is given to electrical equipment at the 100,000-mile general overhaul, apart from motors. This policy is justified by successful experience. However, with more recent equipments, a deliberate move to lighten equipment has led to results indicating the need to overhaul at least selected items of equipment on a periodic basis. If a 30-year life is assumed, this overhaul period should follow logical sub-multiples of this period, i.e. either 5-, 7½-, 10- or 15-year periods. Continuous study and investigation is required to match the overhaul period with the needs of the equipment, at the same time bearing in mind the need for economy.

Each Inspection Shed is located at a principal berthing point, so that a selection of vehicles becomes available for superficial examination and suitable ones can be chosen for due and overdue work. Units with more obvious defects, or in need of more obvious attention, such as renewal of brake blocks, come under notice by C. & W. Examiners located at strategic points, such as main-line termini or large berthing points. Special arrangements are then made to work the unit into a depot in service trains. In cases of serious damage rendering the unit unfit for further service the unit is worked straight into the nearest depot.

Obviously, the amount of stock and the times during which it is available within a depot are of considerable interest to the Maintenance Engineer. It is commonly accepted that there are never enough spare units, so that the more work that can be done on units in traffic the better. One of the complications of the work is that there is a "tidal flow" of passengers and consequently of rolling stock from the coast into town in the morning and out again in the evening. This means that coastal depots such as Ramsgate have to rely on their allocation of maintenance spare units to ensure continuity of employment during the day, while Durnsford Road, Wimbledon, is embarrassed by the rush of stock between 9.30 and 11.30.

## Depot work load is precisely calculated

A major problem is the maintenance of continuity of work and effective utilisation of manpower in depots. Major factors affecting this are the available supply of units, either from spares or from a pool of berthed stock conveniently close at hand, together with the ability to achieve rapid turnover between the working area and the pool. There is a proviso that the working area is reasonably small and hence reasonably priced. The Southern Region is not too well blessed in this respect, as past practice was to build large sheds and all too frequently to use them for stock cleaning as well. A small maintenance shed is a far more economical proposition both in first cost and in annual costs, not least because a small shed is easier to supervise effectively and more economical to heat.

A major factor in the effective employment of labour is undoubtedly the use of work study techniques. From the first, very close liaison was maintained between the work study section and maintenance management to ensure a clear

definition of the problem. The work load on a depot, both in terms of the number of units and the detailed attention required, was defined by management and led to the production of monthly target outputs in each category of stock for each Inspection Shed. This method of presentation enables the effect on depot staffing of major variations in stock types (e.g. replacement of the Brighton six-car units) to be assessed well in advance, so that variations in manpower requirements can be made painlessly over a reasonably long period without causing staff complications.

A necessity frequently neglected is staff training. The Southern Region has rarely been faced with the problem of very widespread introduction of completely new forms of motive power. Its problem is rather one of ensuring that new entrants know how to do the job and do not endanger themselves, together with acquainting the staff with new equipment. This is done by means of a three-car instructional train, which works around the depots to a programme agreed with the Maintenance Engineer.

## Failures are carefully analysed

The Assistant Mechanical & Electrical Engineer (Rolling Stock) is in charge of electric multiple-unit maintenance and has four Area Assistants, each responsible for a number of running depots. At Headquarters there is a technical staff who prepare the maintenance schedules and investigate the larger failures, etc. A running record of failures is kept. For management reporting, "on line" failures, i.e. failures causing a delay of 5min or more in service, are classified under 90 or so headings and reported monthly to the Chief Mechanical & Electrical Engineer. While this covers the failures which have caused actual delays, it is not necessarily a measure of the cost of the work element of failures, which are defined basically as "something that ought not to happen". To obtain a measure of this, non-scheduled work—i.e., that which is done other than as part of planned maintenance—is reported weekly by each depot.

All items coming under notice for out-of-course work are tabulated centrally by type of defect and by type of stock, so that the overall picture which results can be related to the quantity of that stock type running and a relative measure of equipment behaviour obtained. It cannot be over-emphasised that the collection of such statistics is not an end in itself, but a link in a continued cycle of adjustment of a maintenance programme to suit the proved needs of the equipment. The reasons for the failure are analysed as far as possible and a close link is maintained between the Headquarters Technical Staff and the Area Assistants. Frequently the initiative is taken by the area staff, who draw attention to interesting defects before they have developed on a significant scale. From the analysis thus obtained, recommendations are made either for maintenance practices to be changed, for material specifications to be changed or for design alterations to be made. The first alternative is within the province of the Maintenance Engineer; the second two provide a most valuable record, enabling long-term assistance to be given to designers in carrying out modifications to equipment which has given trouble, or in relation to projected new designs.

It is all too easy to develop a complacent attitude of mind towards equipment which has given years of trouble-free (and maintenance-free) operation. It is therefore important to look systematically at those items in order to ensure trouble is not developing. An example of this occurred with jumper heads, where the repair of occasional random accidental damage first raised suspicions. A systematic examination revealed a most uncomfortable degree of trouble, calling for widespread and costly remedial action. While in this case no catastrophic scale of failure has yet resulted, unless vigilance is maintained trouble can develop unseen.

It is customary when speaking of failures to quote failure rates in terms of miles per failure. During 1962, there were 1,690 "on line" failures causing a delay of 5min or more, which were attributable to mechanical and electrical equipment on the stock. During 1962, the total car miles covered were 292m (45m train miles), giving a failures-per-100,000-car-mile figure of 0.57. This is not considered particularly good for the type of traction under consideration. This figure, of itself, is not the whole story, however, as the effort which goes into maintenance is deliberately minimised. The policy is not to eliminate failures, but to reduce them to a reasonably acceptable hazard. This gives a maintenance cost of 2.76d. per car mile, which is considered a commendably low figure. A measure of how this is achieved is seen in the staff employed; in May, 1964 these numbered 681 of all grades, excluding foremen and apprentices, for "running" maintenance of the 4,400 coaches, i.e. approximately 6½ coaches per man. On the repair shop side 398 men are employed, giving an overall total of 1,079.

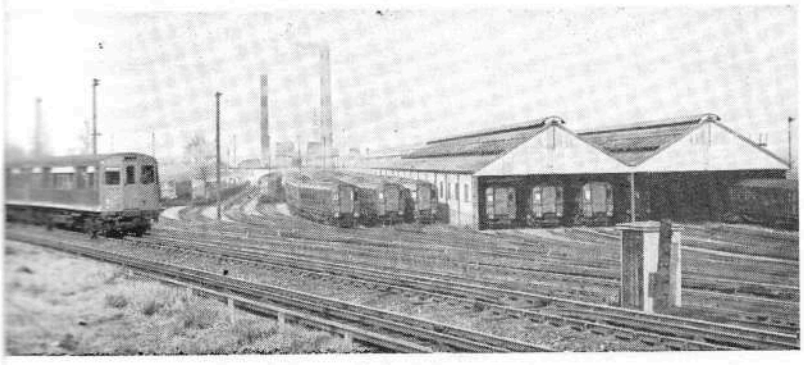
## Upkeep savings repay high first cost

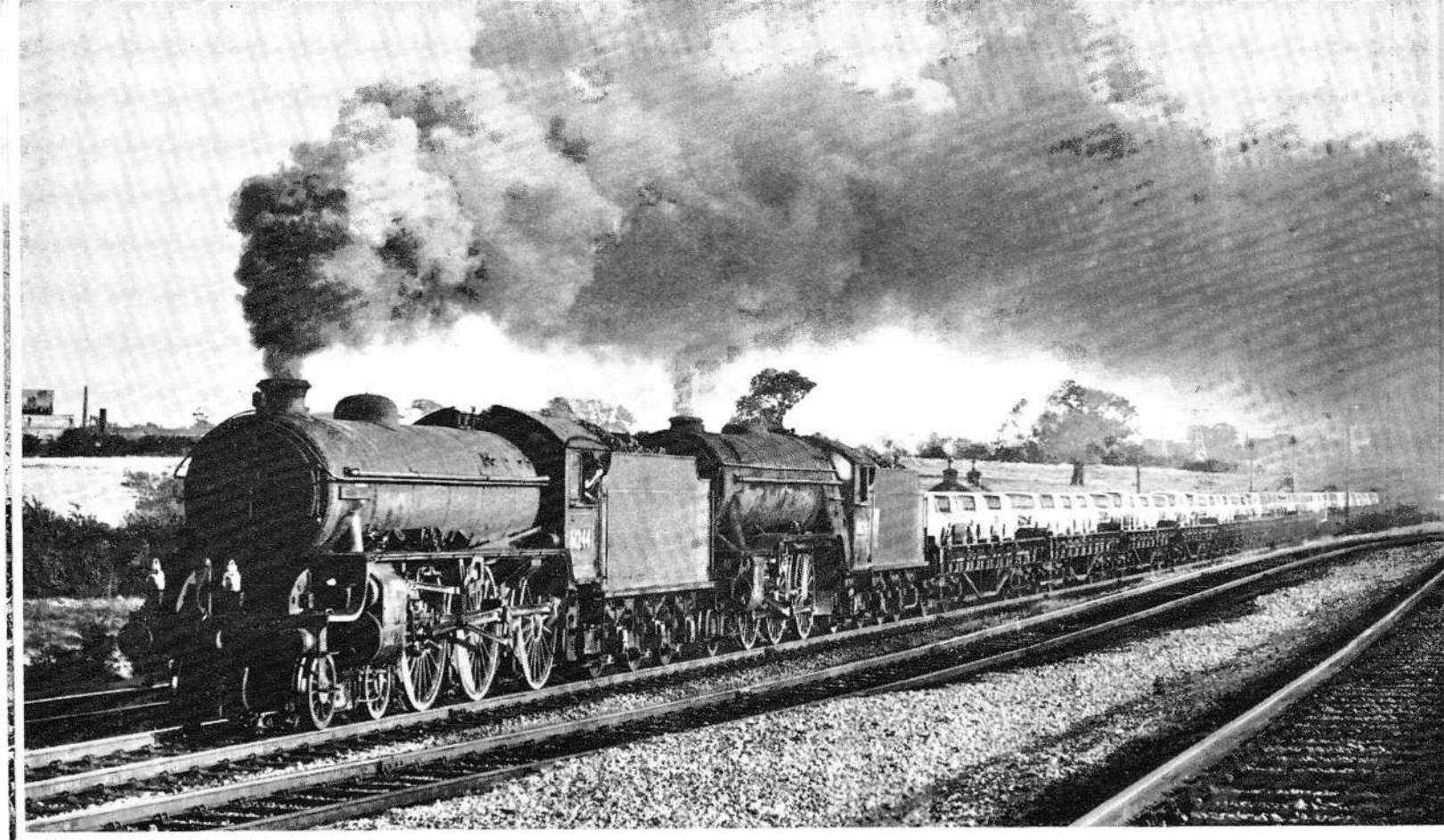
It is a historical fact that the electrical control equipment used on what is known as the "1946-type stock" required little or no periodic overhaul. Motors were totally enclosed and ran in plain bearings. Such work as they occasionally required could be comfortably accommodated in a corner of a repair

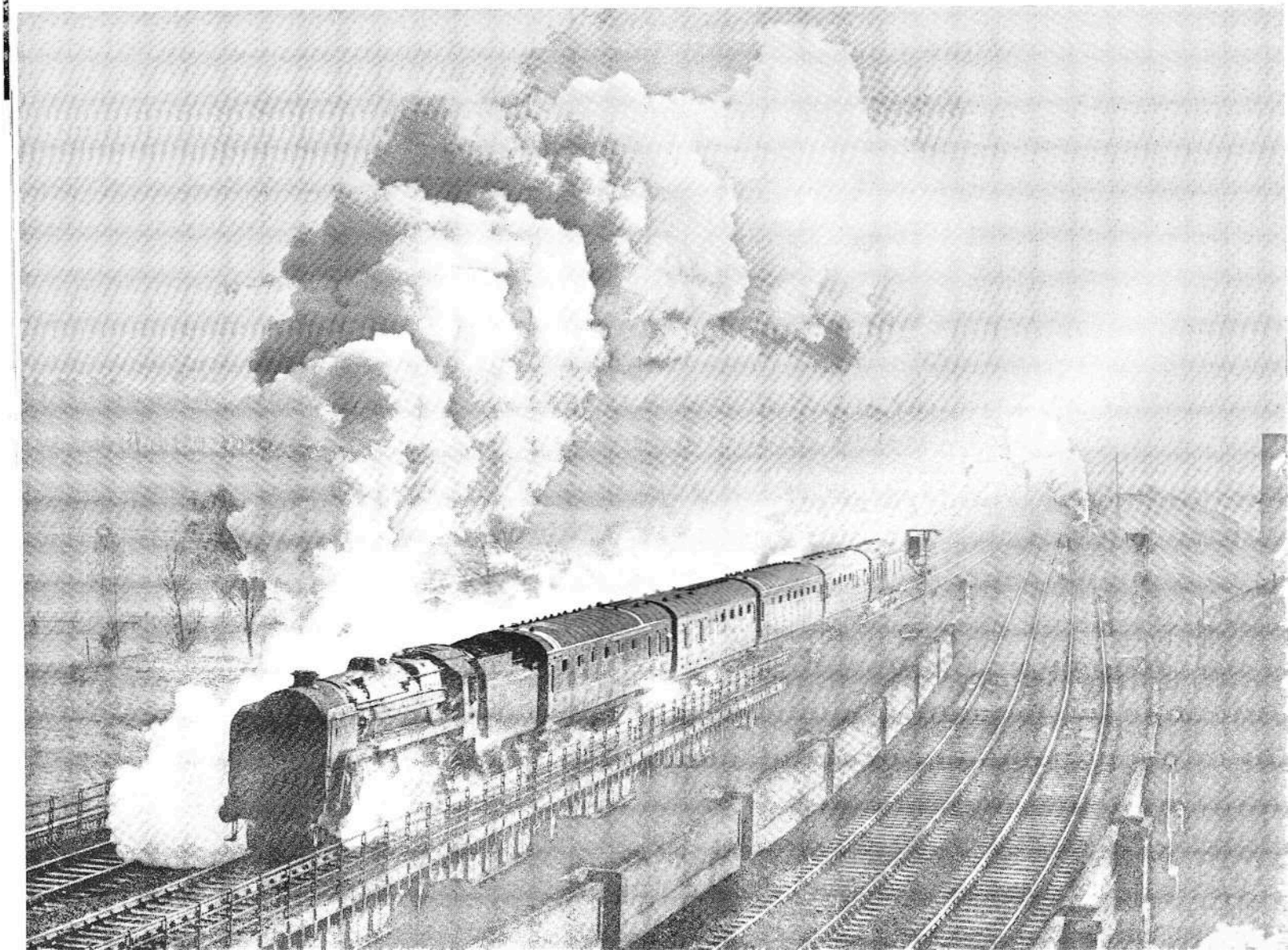
**Concluded on page 165**

**Right:** The electric maintenance depot at Ramsgate. *Photo by British Railways*

**Below:** The electric multiple-unit carriage sheds at Wimbledon Park, alongside the main line out of Waterloo; in the foreground is an LT Upminster–Wimbledon train on the District Line. *Photo by R. C. Riley*







# focus

**This page:** SR "Merchant Navy" 4-6-2 No. 35007 *Aberdeen Commonwealth* approaches Farnborough with a Waterloo–Salisbury semi-fast on January 2, 1965. *Photo by C. T. Gifford*

**Facing page upper:** Class B1 4-6-0 No. 61244 *Strang Steel* and Class V2 2-6-2 No. 60824 leave Carlisle with a Ford car-carrier train from Liverpool to Bathgate. *Photo by P. J. Robinson*

**Facing page lower:** "Clan" Class 4-6-2 No. 72008 *Clan Macleod* restarts the 11.00 Carlisle–Glasgow St. Enoch train from a signal stop at Etterby Bridge Junction, outside Carlisle, on a foggy Saturday morning in November, 1964. *Photo by P. J. Robinson*

**FOCUS concluded**

**Above:** WR 4-6-0 No. 6879 *Overton Grange* leaves Scours Lane yard, Reading, with the 10.29 Reading–Woodford empty wagons and passes Class 9F 2-10-0 No. 92204 standing at signals with an up freight on October 10, 1964.
*Photo by P. J. Robinson*
**Right:** "Western" Class diesel-hydraulic No. D1057 *Western Chieftain* passes Tilehurst, in the Thames Valley, with an up freight on April 14, 1964.
*Photo by P. J. Lynch*
**Below:** WR 2251 Class 0-6-0 No. 2242 at Eardisley railhead, on the former Hereford–Three Cocks Junction branch, on August 19, 1964.
*Photo by B. J. Ashworth*

# MANCHESTER CHEAP-FARE EXPERIMENT DISAPPOINTS

## Peter Craighill

THE Manchester experiment began last August, when fares on two selected lines were reduced by up to a third. This produced a substantial increase in the number of passengers carried, but not enough extra revenue. The fares were therefore raised by 1d in the shilling from Feb. 1. This rise, which takes into account the national increase on that date, still leaves the off-peak fares up to 20 per cent below those applying last summer.

The lines chosen for the trial were the Manchester Piccadilly to Buxton, which has a basic hourly service of diesel multiple-units, and the Manchester Oxford Road to Altrincham, whose d.c. electric trains provide a 20min interval service on the eight-mile route. The Buxton to Manchester off-peak return fare was cut from 6s 9d to 5s. The peak fare, charged to passengers setting out before 9.30, was reduced to 8s 9d. Corresponding reductions from the 10 stations along the line attracted an average of 500 extra passengers daily. On the shorter Altrincham line, the off-peak return fare for the full journey was reduced from 2s 6d to 1s 9d, with proportionate cuts in the peak fares. These produced an extra 350 passengers a day, but 2,000 more fares on the two lines were needed to make the experiment a paying proposition.

### Divisional Manager "not discouraged"

The originator, Mr. Derek Bailey, Divisional Passenger Manager in Manchester, is not discouraged and is continuing market research to find the point where low fares attract enough extra revenue to balance costs. Then the fare-cutting will be extended to other lines in the area. "The simple fact is," Mr. Bailey said, "that insufficient additional passengers travelled to justify retention of the scheme in that form and it had to be modified, but I would emphasise that the new fares are still lower than they were in August, 1964, for off-peak travel."

Why are the excellent services provided by the modern diesel and electric trains in the South Manchester area not more fully used? One answer is the inconvenience of Piccadilly station in relation to the central areas of Manchester.

Its location is markedly remote when compared to Glasgow's Queen Street, Liverpool's Lime Street, and Newcastle-upon-Tyne's Central stations, which have the advantage of being nearer important centres. The BR management must wish that the builders of the original London Road station, who in 1845 stopped short of the Rochdale Canal, had pressed on another half-mile.

### Inconvenience of Manchester Piccadilly

Few places of work or assembly lie at present within a quarter of a mile of the Piccadilly concourse, although some new office buildings have appeared or are planned within this radius. Within half a mile to the south is the edge of a clearance area destined partly for new buildings of the College of Science & Technology and a corporation housing project.

The first section to be completed of the London–Manchester and Liverpool electrification is unfortunately most affected by the remote location. The majority of the suburban electric trains on this line use a new island platform built for them in the form of a bridge over Fairfield Street.

This was erected near the platform ends of the main station in 1960 so that the trains could continue along a half-mile branch to Oxford Road station, where they turn round alongside the d.c. electric trains of the Altrincham line. Oxford Road provides an exchange point for passengers on the two lines and is better placed for the social and entertainments area of the city, but is three-quarters of a mile from the main shopping centres.

Most of the Wilmslow and Crewe line passengers use Piccadilly and they must climb a footbridge connecting the island platform with the main platforms and then walk 200yds to the main concourse of the station before facing another 200yd walk down the station approach. The alternative is to descend about 50 steps to a back entrance, now closed on Saturdays and Sundays, in Fairfield Street. This trek would be less of a discouragement if buses ran from the main station entrance, now in process of being rebuilt.

The location is equally difficult when the off-peak traveller is considered. A suburban wife, for instance, is unlikely to be keen on travelling to Manchester by train if she is left so far from the big stores that she has to use a taxi or bus to complete the journey.

An underground link between Piccadilly station and the better-placed Victoria station has been discussed, but the cost would not help the railways' financial problems. It is hardly more than a vision of the future.

### Decentralisation loses BR business

Some shops and offices are moving out of Manchester, even further depriving the railways of business. The shopping centre in Wilmslow, a growing town on the Crewe line 12 miles south of Manchester, has multiplied in recent years as a result. A resident there does not now need to go to Manchester for high-class shopping. This applies also to other suburbs and satellite towns like Stockport, Oldham, Bury, Bolton and Rochdale. It is another reason why off-peak suburban trains often run empty.

Such problems facing the BR management in the struggle for prosperity emphasise some hard realities. Train operation must at all times be slick. The passenger must be attracted, not frustrated. Would-be fare-payers must not be confronted by unmanned booking-offices; waits at stations and schedules must be cut to the minimum.

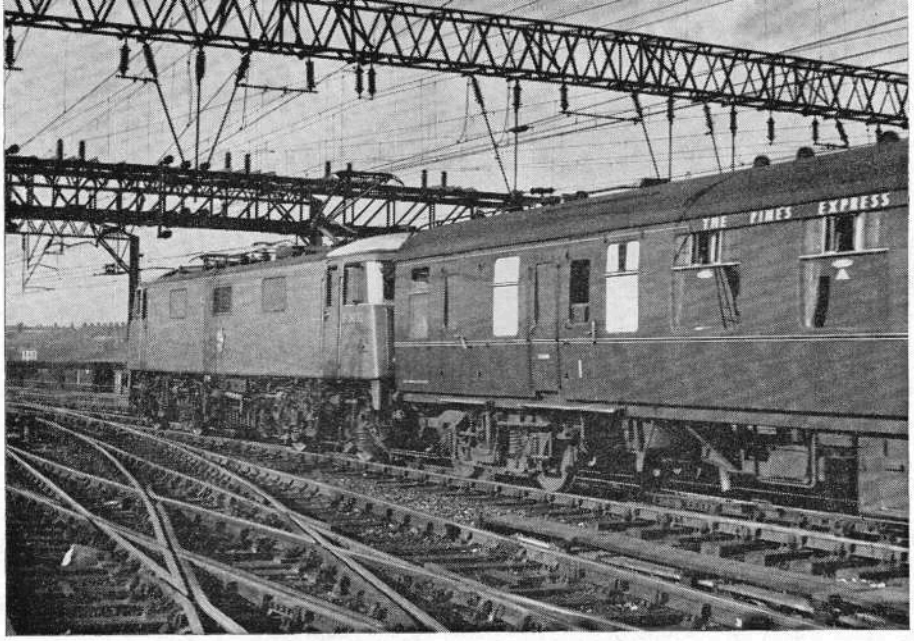
Speed is the suburban railway's biggest advantage over road transport. It is disappointing, when perusing the timetable of stopping trains on the Manchester to Crewe line, to note decelerations of the rapid and comfortable modern electric trains since the first summer of the service. In 1961, most of the trains were allowed the decidedly liberal time of 10min for the 4½ miles from Sandbach to Crewe. Now, the time has been increased in most cases and the 17.05 weekday train from Manchester is allowed 19min. This is in addition to the 30sec stops allowed at each station on the line and rather throws away the advantage of the train's high speed between stations.

### Publicity in the wrong places?

Another question to be considered in seeking the reasons for unfilled trains is whether the ordinary suburban resident is made aware of the excellent services that may be running from his local station and whether the advertising methods in the area need more imagination. Perhaps there is too much reliance on posters on railway property; leaflets in racks on station premises are hardly likely to catch new passengers.

One effect of a recent one-day strike of Manchester busmen, beyond filling the trains and providing the welcome sight of queues at booking offices, was that the following day, when the buses were running normally, the trains were busier than usual.

The cheap fares experiment was also applied to day return tickets from Manchester to London, available by any train except the "Midland Pullman". They were offered at the single fare, £2 6s, second class, and £3 9s first class, and were advertised as "all weather", obviously to win back passengers who are making the journey by air. This bargain doubled the number of day trippers, but these fares, too, had to go up on Feb. 1—by 6s and 9s respectively.




English Electric 3,300 h.p. 25kV a.c. Bo-Bo electric locomotive No. E3032 leaves Stockport Edgeley with the "Pines Express" on the last lap of its journey from Bournemouth to Manchester Piccadilly on September 18, 1964.
*Photo by N. F. W. Dyckhoff*

# Train Running and Traction Performance

**Cecil J. Allen**

A RUN which I made recently on the "Royal Scot" from Euston to Glasgow offers an interesting comparison with the East Coast journeys that I have been describing in recent issues. As this was the Wednesday before Christmas, the West Coast train had two brakevans in addition to its normal ten-coach load and so was made up to 12 vehicles of 408 tons tare and 435 tons gross, though still within the maximum of 420 tons laid down for this schedule. While the weight of the "Royal Scot" was only slightly over that on the "Flying Scotsman" run which I described in the issue of last November, there was a vast difference in power between the West Coast's English Electric Type 4 1Co-Co1 diesel No. D307 of 2,000 h.p. and the East Coast's Type 5 English Electric Co-Co "Deltic" diesel No. D9016, of 3,300 h.p.

## Stop for water—with a diesel

The "Royal Scot" run was destined to be an amusing affair in more ways than one. As Christmas was so closely approaching, I had advised the friends who were to meet me at Glasgow that we might be behind time, but I had not reckoned with the fact that during this week work on the electrification would be temporarily suspended and that with 20min "recovery" between Euston and Crewe we should have a great deal of time in hand. And I certainly had not imagined that, diesel-hauled, we should make quite a lengthy stop at one stage on the run to take water! Actually, of two stops on the nominally non-stop run from Euston to Carlisle, totalling 15min between them, one was at Rugby to attend to the steam-heating, which was giving trouble; and the water stop, at Wigan, was due to the diesel's pick-up scoop being out of order. The steam illusion of the journey was heightened by the fact that over considerable distances the train-heating boiler was blowing off and steam was drifting down the side of the train.

Out of Euston we had not a single check of any kind in the first 80 miles. In consequence, with the diesel being driven normally and without a higher maximum speed than 82 m.p.h., as shown in Table 1, "even time" from the start was attained in less than 40 miles; by Weedon, 69.7 miles in 63min 11sec, we were already 1¾min ahead of schedule. Hillmorton, 80.3 miles, was passed in 71min 57sec, which means that we could have stopped in Rugby station in 75min comfortably, but instead of that we came to a stand at the outer home signal and were there for 4½min before moving on to a second stop of 8min duration in the station, while the steam heating was being attended to. I should put the combined cost of the two stops at about 16½min—despite which we were still just over 1min early on passing Shilton.

Once again a completely clear road was ahead of us as far as Warrington and steady gains on time continued again with no higher speeds than 82–83½ m.p.h. at any point. From Rugby start we passed Stafford, 51.0 miles, in 43min 33 sec, and milepost 156, 73.45 miles, in 62min 42sec; once again "even time" from Euston had been attained on passing Norton Bridge and a stop could have been effected at Crewe in 157min from London. So Stafford, 133.55 miles, was passed in 117¼min net, and Crewe in 140min net, 4min less than the 297-ton "Coronation Scot" was allowed with "Coronation" 4-6-2 steam power in 1939. Warrington, 182.15 miles, was cleared in 177min 59sec, or 161½min net, and by Winwick Junction once again we were 10½min ahead of booked time. Then came a lengthy permanent way slowing past Golborne Junction and a leisurely recovery was brought to an end when the driver decided to stop at Wigan to replenish his water supply.

## Only 25 m.p.h. over Shap

After 7min standing he had to recover speed up the steep climb to Boars Head and further time was dropped by a 20 m.p.h. relaying check at Farington, with the result that it was exactly on time when we ran slowly through Preston. I should calculate the Golborne and Wigan delays between them as having cost 10½min and Farington as worth 1½min, so that the actual 218min 21sec for the 209.0 miles from Euston to Preston was just under 190min net. After that we were to suffer one more check only, by signals beyond Hest Bank, costing 2½min, which brought the total from out-of-course delays to 31min. Up the final 1 in 106 of Grayrigg bank speed dropped to 37½ m.p.h. and on the last 4 miles at 1 in 75 up to Shap Summit it settled down to a steady 25 m.p.h. The summit box was passed on time to the second and a brisk run down to Carlisle, aided by the final 3min "recovery", saw us at a stand in Citadel station 4min early. The 299.1 miles from Euston to Carlisle had been covered in a second under 312min, or in 281min net, the latter 2min less than the pre-war "Coronation Scot" time. Deducting the total of 25min for recovery in the schedule, No. D307 had gained 10min net on the net booked time of 291min.

At Carlisle, crews were changed as usual and once more our diesel was observed taking water, a process which again lasted for 7min; so our 4min early arrival was changed to a 1min late departure. One could not help mentally comparing the 85 to 90 m.p.h. of a similarly loaded "Deltic" up 1 in 200 gradients

with our minimum of 54 m.p.h. up this inclination past Kirkpatrick, but this would have been enough for timekeeping had there not been the slowing for drainage work at Kirtlebridge. Only ½min of the 2¼min so lost was regained along the undulations from Lockerbie, with speeds of 71½ to 77½ m.p.h. where a "Deltic" would have been sustaining 90 m.p.h. on not much more than half-throttle. Up Beattock bank, in Scottish hands, No. D307 did slightly better than in English hands up Shap; the 1 in 75 of the latter reduced the speed to 25 m.p.h., but up Beattock, after a gradual fall to 26 m.p.h. up steepening grades from 1 in 79 to 69, speed recovered to 27½ up the final 1 in 74–77.

A bare ½min was dropped between Beattock and the summit, but all the lost time was more than easily recovered down to Carstairs, which was passed a shade before time. Ultimately, after two delays costing between them 3¼min, we stopped in Glasgow just over 1min early, in a net time of 106½min from Carlisle. Net gains throughout the journey from London had totalled 36½min; allowing for the booked 2min stop at Carlisle, this made the net time from Euston to Glasgow 6hr 29½min, ½min less than the 6½hr "Coronation Scot" schedule of 1937–1939, though with 408 as compared with 297 tare tons.

## An unhappy "Royal Scot" run

My return journey to London with the same train on New Year's Eve was of a very different order, though not through any fault of the motive power. In this direction the formation was down to the normal 10 coaches, of 356 tons tare and 375 tons gross, headed by No. D222. Troubles started early, with a dead stand for signals at Leggatfoot box; I imagine that Thankerton box must have switched out, for it was evidently a collection of several freights at Symington that had held us up. But Beattock Summit was passed less than 1½min late, and without any speed even as high as 80 m.p.h. the train was just ahead of time at Gretna. Carlisle was not ready to receive us, however, and owing to a stop outside Citadel, we took 110min

### 1 LMR EUSTON–CARLISLE

Locomotive: Type 4 1Co-Co1 Diesel No. D307 (2,000 h.p.).
Load: 12 coaches, 408 tons tare, 435 tons gross

| Dist. | | Sched. | Actual | Speeds |
|---|---|---|---|---|
| miles | | min. | m. s. | m.p.h. |
| 0.00 | EUSTON ... ... | 0 | 0 00 | — |
| 3.15 | Kilburn High Rd. | — | 6 07 | — |
| 5.40 | WILLESDEN JUNC. | 9 | 8 43 | 63½ |
| 8.05 | Wembley ... ... | — | 11 26 | 62½ |
| 11.40 | Harrow ... ... | (†5) | 14 28 | 61½ |
| 13.30 | Hatch End ... | — | 16 19 | 61½ |
| 17.45 | WATFORD JUNC. | 26 | 20 11 | 70½ |
| 20.95 | Kings Langley ... | — | 23 14 | 69 |
| 24.50 | Hemel Hempstead | — | 26 27 | 66 |
| 27.95 | Berkhamsted ... | — | 29 37 | 62½ |
| 31 65 | TRING ... ... | 39½ | 33 09 | 65 |
| 36.10 | Cheddington ... | — | 36 42 | 82 |
| 40.20 | Leighton ... ... | — | 39 43 | 82 |
| 46.65 | BLETCHLEY ... | 51½ | 44 49 | 77½ |
| 52.40 | Wolverton ... | (†5) | 49 14 | 82 |
| 59.90 | Roade ... ... | 67½ | 55 21 | 68 |
| 62.85 | *Blisworth* ... ... | 70½ | 57 54 | 76½ |
| 69.70 | *Weedon* ... ... | 76½ | 63 11 | 79 |
| 75.30 | *Welton* ... ... | (†5) | 67 54 | 66/72 |
| | | | *sig. stop* | *0 |
| 82.55 | RUGBY ... | pass 93 | 82 14 90 17 | — — |
| 88.10 | *Brinklow* ... ... | — | 96 49 | 63½ |
| 91.40 | *Shilton* ... ... | 101 | 99 49 | 69 |
| 97.10 | NUNEATON ... | 106½ | 104 40 | 76½ |
| 102.30 | Atherstone ... | — | 108 49 | *72 |
| 106.50 | Polesworth ... | — | 112 04 | 82 |
| 110.00 | TAMWORTH ... | 116½ | 114 41 | 83½ |
| 116.25 | LICHFIELD ... | 121½ | 119 24 | 77½ |
| 124.30 | Rugeley ... ... | 128 | 125 49 | 79 |
| 127.15 | *Colwich* ... ... | 130½ | 128 14 | 73 |
| 129.55 | *Milford* ... ... | 132½ (†5) | 130 04 | — |
| 133.55 | STAFFORD ... | 141½ | 133 50 | *62 |
| 138.85 | Norton Bridge ... | 146½ | 138 39 | 69 |
| 147.65 | *Whitmore* ... ... | — | 146 15 | 67 |
| 150.05 | *Madeley* ... ... | 157 | 148 34 | — |
| 156.00 | *Milepost* 156 ... | — | 152 59 | 82 |
| 158.00 | CREWE ... ... | 164 | 156 31 | *25 |
| 162.90 | *Minshull Vernon* ... | — | 161 46 | — |
| 166.80 | *Winsford Junc.* ... | 174½ | 165 55 | 74 |
| 169.85 | Hartford ... ... | — | 168 12 | 80½/79 |
| 174.40 | *Weaver Junc.* ... | 180½ | 171 48 | 82 |
| 179.30 | *Moore* ... ... | — | 175 29 | 72/64 |
| 182.15 | WARRINGTON ... | 187½ | 177 59 | 68 |
| 185.65 | *Winwick Junc.* ... | 191½ | 181 04 | 68 |
| | | | *p.w.s.* | *45 |
| 189.10 | *Golborne Junc.* ... | — | 184 23 | — |
| 193.90 | WIGAN ... | pass 200½ | 190 26 197 30 | — — |
| 197.15 | *Standish* ... ... | 205 | 204 13 | 45 |
| 198.65 | *Milepost* 11½ ... | (†2) | 206 18 | 45 |
| 202.25 | Balshaw Lane ... | — | 209 30 | 79 |
| 203.55 | *Euxton Junc.* ... | 213½ | 210 30 | *72 |
| 205.00 | Leyland ... ... | — | 211 43 | 76½ |
| | | | *p.w.s.* | *20 |
| 209.00 | PRESTON ... | 218½ | 218 21 | *20 |
| 210.35 | *Oxheys* ... ... | — | 220 51 | 42 |
| 213.35 | *Barton* ... ... | — | 224 50 | 61 |
| 218.50 | Garstang ... ... | 230½ | 229 03 | 71½ |
| 224.25 | *Bay Horse* ... ... | — | 234 01 | 69 |
| 228.90 | *Lancaster No. 1* ... | — | 238 01 | *62 |
| 230.00 | LANCASTER ... | 240½ | 238 57 | 70½ |
| 233.10 | Hest Bank ... | — | 241 26 | 79 |
| | | | *sigs.* | *25 |
| 236.25 | CARNFORTH ... | 246 | 245 59 | 59 |
| 239.50 | *Milepost* 9½ ... | — | 249 35 | 48 |
| 243.55 | Milnthorpe ... | — | 253 31 | 66 |
| 249.10 | OXENHOLME ... | 259 | 259 31 | 50 |
| 256.15 | *Grayrigg* ... ... | — | 268 55 | 37½ |
| 262.10 | TEBAY ... ... | 276½ | 276 06 | 67 |
| 265.10 | *Scout Green* ... | — | 279 39 | 34 |
| 267.55 | *Shap Summit* ... | 285 | 285 01 | 25 |
| 272.90 | *Thrimby Grange* ... | — | 290 14 | 85 |
| 281.25 | PENRITH ... ... | 298 | 296 48 | *66 |
| 286.15 | *Plumpton* ... ... | 302½ | 300 41 | 82/77½ |
| 294.30 | *Wreay* ... ... | (†3) | 306 51 | 83½/*75 |
| 297.70 | *Carlisle No. 13* ... | — | 309 40 | — |
| 299.10 | CARLISLE ... | 316 | 311 59 | — |

### 2 SC. R. CARLISLE–GLASGOW

Locomotive: Type 4 1Co-Co1 Diesel No. D307 (2,000 h.p.).
Load: 12 coaches, 408 tons tare, 435 tons gross.

| Dist. | | Sched. | Actual | Speeds |
|---|---|---|---|---|
| miles | | min. | m. s. | m.p.h. |
| 0.00 | CARLISLE ... | 0 | 0 00 | — |
| 6.05 | *Floriston* ... ... | — | 7 57 | 71½ |
| 8.60 | *Gretna Junc.* ... | 10 | 10 03 | *64 |
| 12.85 | *Kirkpatrick* ... | — | 14 32 | 55½/54 |
| | | | *p.w.s.* | *37 |
| 16.60 | *Kirtlebridge* ... | — | 18 30 | — |
| 20.00 | *Ecclefechan* ... | — | 23 20 | — |
| 25.65 | LOCKERBIE ... | 27 | 29 18 | 75 |
| 28.55 | *Nethercleugh* ... | — | 31 38 | 77½ |
| 31.60 | *Dinwoodie* ... ... | — | 33 59 | 74 |
| 34.40 | *Wamphray* ... ... | — | 36 15 | 71½/75 |
| 39.60 | BEATTOCK ... | 39 | 40 50 | 61½ |
| 45.30 | *Greskine* ... ... | — | 49 53 | 26 |
| 49.60 | *Beattock Summit* ... | 57 | 59 19 | 27½ |
| 52.50 | Elvanfoot ... ... | — | 62 20 | 76½/75 |
| 55.15 | Crawford ... ... | — | 64 22 | 80½/77½ |
| 57.70 | Abington ... ... | — | 66 17 | 82/75 |
| 63.10 | Lamington ... ... | — | 70 28 | 77½ |
| 66.80 | SYMINGTON ... | — | 73 20 | 70½ |
| 68.45 | Thankerton ... ... | — | 74 38 | 80½ |
| 73.50 | CARSTAIRS ... | 80 | 78 43 | *47 |
| 76.25 | Cleghorn ... ... | 83 | 82 07 | — |
| 78.45 | *Craigenhill* ... | — | 84 28 | — |
| 81.90 | Carluke ... ... | — | 87 23 | 79 |
| 84.00 | LAW JUNC. ... | 91 | 89 12 | *49 |
| 86.40 | *Wishaw South* ... | — | 91 48 | 71½ |
| 88.25 | Flemington ... | — | 93 22 | *62 |
| 89.40 | MOTHERWELL ... | 96 | 94 33 | *51 |
| | | | *sigs.* | *40 |
| 93.80 | Uddingston ... | 100 | 99 15 | — |
| 95.65 | Newton ... ... | 102 | 101 13 | 57 |
| 99.10 | Rutherglen ... | — | 104 45 | 64½ |
| 101.25 | *Eglinton Street* ... | 109 | 107 28 | *38 |
| 102.25 | GLASGOW CENT. | 112 | 109 47 | — |

### 3 LMR CREWE–RUGBY

Locomotive: Type 4 1Co-Co1 Diesel No. D222 (2,000 h.p.).
Load: 10 coaches, 356 tons tare, 375 tons gross.

| Dist. | | Sched. | Actual | Speeds |
|---|---|---|---|---|
| miles | | min. | m. s. | m.p.h. |
| 0.00 | CREWE ... ... | ‡0 | ‡0 00 | *20 |
| 4.75 | *Betley Road* ... | — | 6 21 | — |
| 7.95 | *Madeley* ... ... | 11 | 9 45 | 58½ |
| 10.35 | *Whitmore* ... ... | — | 12 21 | — |
| 19.15 | Norton Bridge ... | 22 | 18 57 | 80½ |
| 24.45 | STAFFORD ... | 26 | 23 23 | *58 |
| 28.45 | *Milford* ... ... | 30 | 27 08 | — |
| 30.85 | *Colwich* ... ... | 32½ | 29 08 | 74 |
| 33.70 | Rugeley ... ... | 35 | 31 26 | 76½ |
| 37.00 | *Armitage* ... ... | — | 33 57 | — |
| 41.75 | LICHFIELD ... | 41½ | 37 46 | 82 |
| 48.10 | TAMWORTH ... | 46½ | 42 34 | 75 |
| 51.60 | Polesworth ... | — | 45 19 | 75 |
| 55.80 | Atherstone ... | — | 48 53 | *69 |
| 61.00 | NUNEATON ... | 58 (†2) | 53 08 | 77½ |
| 66.70 | *Shilton* ... ... | 65 | 57 57 | 71½ |
| 70.00 | *Brinklow* ... ... | (†3) | 60 34 | 77½ |
| | | | *sigs.* | *20 |
| 75.55 | RUGBY ... ... | ‡75½ | §67 08 | * 0 |

* Speed restriction. † Recovery time (min.).
‡ Passing time. § Time to stop. ¶ *Fog*

### 4 LMR RUGBY–CREWE

Locomotive: Co-Co Electric No. E3052 (3,300 h.p.).
Load: 10 coaches, 351 tons tare, 375 tons gross.

| Dist. | | Sched. | Actual | Speeds |
|---|---|---|---|---|
| miles | | min | m. s. | m.p.h. |
| 0.00 | RUGBY ... ... | 0 | 0 00 | — |
| 5.55 | *Brinklow* ... ... | — | 4 54 | 90 |
| 8.85 | *Shilton* ... ... | 7½ | 7 05 | 90 |
| 14.55 | NUNEATON ... | 11½ | 10 57 | 89 |
| 19.75 | Atherstone ... | — | 14 38 | *71 |
| 23.95 | Polesworth ... | — | 17 37 | 95 |
| 27.45 | TAMWORTH ... | 21 | 19 50 | 90 |
| 33.70 | LICHFIELD ... | 25 | 24 07 | ‡84 |
| 41.75 | Rugeley ... ... | 31 | 29 22 | 93 |
| 44.60 | *Colwich* ... ... | 33 | 31 18 | *84 |
| 47.00 | *Milford* ... ... | 35 | 33 00 | 86 |
| | | | *sig. stop* | *0 |
| 51.00 | STAFFORD .... | 38½ | 38 22 | — |
| 56.30 | Norton Bridge ... | 42½ | 42 22 | 87 |
| 58.45 | *Milepost* 141 ... | — | 43 48 | 92 |
| 59.45 | ,, 142 ... | — | 44 26 | 95 |
| 60.45 | ,, 143 ... | — | 45 03 | 97 |
| 61.45 | ,, 144 ... | — | 45 40 | 97 |
| 62.45 | ,, 145 ... | — | 46 17 | 97 |
| 63.45 | ,, 146 ... | — | 46 57 | ¶88 |
| 64.45 | ,, 147 ... | — | 47 40 | ¶84 |
| 65.10 | *Whitmore* ... ... | — | 48 08 | ¶84 |
| 67.50 | *Madeley* ... ... | 50 | 49 52 | ¶82 |
| 73.20 | *Basford Road* ... | (†2½) | 54 57 | *eased* |
| 75.45 | CREWE ... ... | 59½ | 57 25 | — |

### 5 WR LEAMINGTON SPA–PADDINGTON

Locomotive: Type 4 Co-Co Diesel No. D1707 (2,750 h.p.).
Load: 11 coaches, 391 tons tare, 420 tons gross.

| Dist. | | Sched. | Actual | Speeds |
|---|---|---|---|---|
| miles | | min. | m. s. | m.p.h. |
| 0.00 | LEAMINGTON SPA | 0 | 0 00 | — |
| 3.80 | *Fosse Road* ... | — | 4 57 | 64 |
| 6.15 | Southam Road ... | — | 7 08 | 67/76 |
| | | | *p.w.s.* | *42 |
| 11.10 | Fenny Compton ... | — | 11 58 | — |
| | | | *sigs.* | *8 |
| 16.25 | *Cropredy* ... ... | — | 20 02 | 72 |
| 19.85 | BANBURY ... | 20 | 24 12 | — |
| 3.55 | Kings Sutton ... | — | 4 44 | 76 |
| 5.10 | *Aynho Junction* ... | (†3½) | 5 59 | *72 |
| 10.30 | *Ardley* ... ... | 14 | 10 13 | 72/81 |
| 14.10 | BICESTER... ... | — | 12 51 | 94 |
| 17.10 | *Blackthorn* ... | — | 14 48 | 91 |
| 20.05 | *Brill* ... ... | — | 16 45 | 91 |
| 23.45 | *Ashendon Junc.* ... | 23½ | 19 41 | *57 |
| 27.40 | *Haddenham* ... | — | 23 08 | 80/85 |
| | | | *p.w.s.* | *56 |
| 32.80 | PR. RISBOROUGH | 31½ | 27 29 | — |
| 35.95 | Saunderton ... | — | 30 32 | 60/73 |
| 38.70 | West Wycombe ... | — | 33 03 | *42 |
| 40.95 | HIGH WYCOMBE | 42 | 37 06 | — |
| 4.85 | Beaconsfield ... | — | 5 39 | 62/73 |
| 9.10 | Gerrards Cross ... | — | 8 42 | 95 |
| 11.75 | Denham ... ... | 12½ | 10 22 | 97 |
| 14.45 | West Ruislip ... | — | 12 16 | *82 |
| | | | *p.w.s.* | *62 |
| 16.50 | *Northolt Junc. E.* ... | 16½ | 14 06 | — |
| 18.75 | Greenford ... | 18 | 16 10 | 83 |
| 23.30 | *Old Oak Com. W. Junc.* ... ... | 22½ | 20 03 | *42 |
| | | | *sigs.* | *27 |
| 25.30 | Westbourne Park | 25 | 23 22 | — |
| 26.55 | PADDINGTON ... | 31 | 27 57 | — |

53sec instead of the allotted 109min from Glasgow. The two signal stops had cost nearly 9½min, leaving a net time of 101½min for the 102.3 miles.

Carlisle Citadel appeared to be somewhat out of gear. The Edinburgh portion of the up "Thames–Clyde Express" was standing in one of the south end bay platforms, headed by a "Clan" 4-6-2 and a Class 5 4-6-0; this made me wonder if the Glasgow train, which should have left more than 20min earlier, had broken down and was to be worked by this pair southwards to Leeds. Something also had evidently been allowed to leave Carlisle immediately in front of us, for we caught its signals half-way up the bank to Wreay and again badly at Thrimby Grange and Shap before passing the offender in the loop at Shap Summit, a lengthy train headed by another Class 5 4-6-0. With misty windows I could not verify if this was the 9.30 from Glasgow to Liverpool and Manchester, which should have been into Preston 20min ahead of the "Royal Scot", or a train of empty stock.

The result of these delays was that our 4min lateness out of Carlisle had become nearly 7min late past the summit. More checks then followed thick and fast; the train was all but stopped by signals at Lancaster (where permanent way work also was in progress), had more signal checks at Garstang and Barton, slowed to 10 m.p.h. outside Preston and finally stopped in that station for 2½min, apparently for some unhurried movements across our track immediately ahead. So Preston was left 15½min behind the "Royal Scot's" booked passing time. To Coppenhall Junction 4½min was recovered, but some of this was lost again by a 10 m.p.h. signal check outside Crewe.

Then at last, over the electrified main line to Rugby, we did get a clear road for 75 miles and the driver of No. D222 made good use of it, as Table 3 shows. Again there were no exceptional features in the running; 58½ m.p.h. at the top of the 1 in 177 past Madeley was no more than moderate and the tailing off in speed from 82 m.p.h. at Hademore to 75 at Tamworth was not impressive. Yet even so time was being picked up handsomely and after leaving Crewe 13min late we ought to have been no more than 3½ to 4min late through Rugby. So I had visions of being on time, if not early, into Euston; but what a hope!

In Rugby station we stopped, and looking ahead I could see that the "Royal Scot" was signalled to take the Northampton line; no doubt electrification work was in progress in Kilsby tunnel. After that we were slowed to 12 m.p.h. for permanent way work at Kilsby; stopped by signal outside Northampton; slowed to 21 m.p.h. to cross over to the fast lines at Roade; slowed to 20 m.p.h. at both Bletchley and Leighton to cross to the slow line and back to the fast because of a diesel standing on the fast line between these points, apparently broken down; slowed to 20 m.p.h. for permanent way work at Berkhamsted; and stopped by signal outside Willesden. Notwithstanding 16½min recovery allowance between Rugby and Euston, we managed to lose another 18min between these points and so arrived 24min late. This nominally non-stop run from Carlisle had suffered four dead stands for signals (in addition to the two in Scotland), 12 signal checks, three permanent way checks, and the diversion and extra distance through Northampton, an unhappy experience with a train of such importance as this.

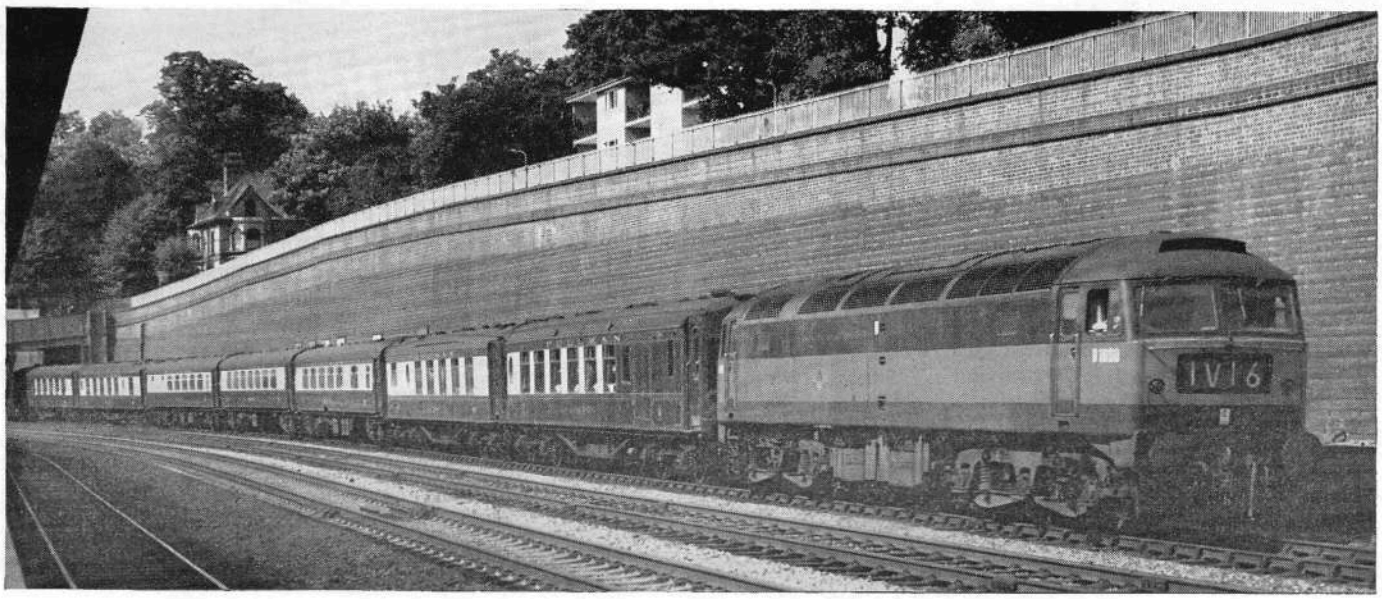
## West Coast Route needs higher power

There is one point about operation over the West Coast main line that I find it very difficult to understand. Recently the progressive Great Eastern Line section of the Eastern Region has managed to get its 2,000 h.p. English Electric diesels exchanged for 2,750 Brush Type 4 units, the specific reason being to allow for more ability to recover time lost by permanent way relaying slacks on the tightly-timed London–Norwich trains. The Midland Lines of the LMR are well supplied with BR/Sulzer Type 4 diesels of 2,500 h.p., on the whole keeping admirable time with the fastest schedules in Midland history. Yet despite the fact that Brush Type 4 2,750 h.p. diesels are under construction to a total of no fewer than 400 units, the Western Lines of the LMR, apart from electric working between Rugby, Crewe, Liverpool and Manchester, are still tied down to diesels of no more than 2,000 h.p., even with a summit as high as Shap—and the even higher Beattock summit north of the Border—to be surmounted by the West Coast trains. The English Electric 2,000 h.p. units have done and still are doing well, but there is a great deal of difference between the potentialities of heavy 1Co-Co1 2,000 and modern Co-Co 2,750 h.p. units.

It is most unfortunate that, with the schedules of the West Coast day trains already inflated by 25min of recovery time, another 15 to 20min has now been added to allow for continuous rail welding between Carnforth and Carlisle. Who could ever have dreamed that the day would come when the fastest train from Kings Cross to Glasgow Queen Street—the 16.00 down "Talisman"—would make the journey of 440 miles in 25min less than the fastest train from Euston to Glasgow Central—the 10.00 "Royal Scot" over a route of 401½ miles only? Indeed, it is in 36min less if allowance be made for the fact that the "Talisman" makes three intermediate stops totalling 13min as compared with the "Royal Scot's" one stop only of 2min at Carlisle.

One would have thought that no effort would be spared, even while electrification and track improvements are proceeding, to keep the West Coast times of the day trains down to the lowest possible limits, in view of the increasing severity of air competition, but it is difficult to see any such attempt being made.

Brush 2,750 h.p. Type 4 diesel-electric No. D1690 arrives at High Wycombe with the 13.00 Birmingham–Paddington Pullman on August 26, 1964; on this date a locomotive-hauled formation, including three of the modern East Coast route Pullmans, was deputising for one of the "Blue Pullman" units. *Photo by H. K. Harman*



Indeed, over a main line with speeds up to 90 m.p.h. authorised for the major part of its length, and even with 100 m.p.h. stretches, it is clear from the runs tabulated that the diesels seldom exceed 82–83 m.p.h., and in this modern age minima of 25 and 26 m.p.h. up banks like Shap and Beattock are altogether out of date. Even when the present electrification is complete, dependence must still be placed on diesel traction north of Crewe for a long time to come; here a change to higher power seems badly overdue.

## 81 m.p.h. for 75 miles with a.c. traction

A brighter picture is presented by Table 4, which shows what may be expected between Euston and Crewe when the desirable end just mentioned is reached. The log reproduced, timed by Keith M. Swain, was on the fastest timetabled run in Great Britain today, that of the 7.55 out of Euston, from Rugby to Crewe, 75.55 miles, in a working time of 59½min, average 76.2 m.p.h. As compared with former years, this train has now shrunk to a load of 10 bogies only, on this journey totalling 351 tons tare and 375 tons gross, hauled by Bo-Bo electric locomotive No. E3052. There was some thickish fog about, especially between Tamworth and Lichfield and from Whitmore onwards, but with the safeguard of AWS the speed seems to have been but little affected. It will be noted that this lightning schedule actually includes 2½min recovery time, so that the net allowance is 57min only, for an average of 79.5 m.p.h. start to stop.

Although the log does not show the authorised maximum of 100 m.p.h. being reached, doubtless it would have been attained down from Whitmore had it not been for the thickening of the fog over this stage. More remarkable, however, was the steady 97 m.p.h. up the 1 in 650–590 past Standon Bridge. Before this length was reached, the train had been brought to a dead stand by signals on the Queensville curve, just before Stafford; up to that point No. E3052 had gained 2min by passing Milford, 47.0 miles from the Rugby start, in exactly 33min. Despite the stop, time was kept to Madeley and then a commendably clear road was obtained into Crewe, the 2½min recovery here not being needed. So the run of 75.45 miles was completed in 57min 25sec, or in 55½min net, the latter representing a net start-to-stop average of 81.6 m.p.h.

The fact that a diesel-hauled train like the "Royal Scot" has to work among these electric locomotives, with their speeds of 90 m.p.h. and over, seems yet another reason why diesel units are called for capable of sustaining similar speeds through this area. In this connection it is instructive to compare Tables 1 and 4 as between Rugby and Crewe. Admittedly with the lighter load, the electric locomotive passed Atherstone in 14min 38sec from Rugby as compared with the diesel's 18min 32sec, maintaining 89 to 90 m.p.h. as against 63½ to 76½ m.p.h. All the later electric speeds were far higher, though it must be conceded, of course, that the diesel was running ahead of time, so that its driver had no particular reason for haste. But it was a different matter on my up "Royal Scot" run in Table 3, when we were behind time with exactly the same tonnage as the electric, but never touched more than 82 m.p.h., and for much of the distance were travelling at 74 to 77½ m.p.h. only.

## Smart Brush Type 4 work on Birmingham line

Finally, as so much has been said in this article about the 2,750 h.p. Brush Type 4 diesels, it is appropriate to set out in Table 6 one of the many runs that are reaching me constantly from correspondents of their performances on the Western and London Midland Region Paddington–Birmingham trains. This was an up journey, timed by Nigel S. Forster, on the 20.00 from Snow Hill to London. Owing to checks, departure from Banbury was 5min late, but with an 11-coach load of 420 tons gross the driver of No. D1707 had recovered all the arrears by High Wycombe. Notable features over this stretch were the maintained 72 m.p.h. up the 1 in 200 from Aynho Junction to Ardley summit, and the acceleration from 56 to 60 up the 1 in 167 from Princes Risborough to Saunderton summit, while there was a lively 94 m.p.h. down the 1 in 200 past Bicester.

Overtime at High Wycombe resulted in a 2min late start from there, but a brilliant start resulted in an acceleration to 62 m.p.h. up the rising grades before Beaconsfield and then so rapid as to produce 73 m.p.h. through that station, 95 at Gerrards Cross and 97 at Denham, after which came the slowing to what now appears to be a permanent restriction past Northolt Junction. The lost 2min had been recouped as early as Denham and with ease No. D1707 cut the 31min allowance from High Wycombe to Paddington to just under 28min, a signal check notwithstanding. Over the three stages of the journey the net times were 19min for the 19.85 miles from Leamington to Banbury, 36½min for the 40.95 miles on to Wycombe, and 26½min for the final 26.55 miles into Paddington, a total net gain to locomotive of 11min. The Paddington–Wolverhampton service is fortunate in having the services of these most capable diesel units.

(The author gratefully acknowledges letters received up to January 16 from H. M. Absolon, D. C. Adams, P. Ankers, Marcel Aubert, L. G. Bowhay, John M. Charteris, A. Crane, Richard Davies, Nigel S. Forster, S. C. Gray, D. A. W. Green, J. R. Long, B. I. Nathan, D. H. A. Ratcliffe, Keith M. Swain, Brian Wilkinson and "4959".)

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## OUTLOOK FOR SOUTHERN PASSENGERS

**Concluded from page 153**

**McKenna:** That is very difficult to prophesy at this stage. We've got plenty of time to think about it.

**Allen:** If you believe that the Channel Tunnel can recapture the carriage trade for the railway, shouldn't you do all you can to cherish what is left of it in the interim? One would have thought it desirable to maintain higher levels of comfort and solicitude for passengers on the "Golden Arrow", in particular, so that the image doesn't have to be rebuilt from scratch. Standards may be reasonable on the train between London and Dover, but comes the Channel crossing and an "Arrow" passenger seems to be just one of the herd.

**McKenna:** No, I don't accept this. There's a danger that you become one of the herd if you travel at one of the half-dozen or so popular weekends in the summer, but if you travel at any other time I think you receive excellent treatment and service. We suffer from this inescapable problem of heavy peaks. And that's when all our complaints arise.

**Allen:** Finally, Mr. McKenna, how would you sum up the Region's prospects for the future?

**McKenna:** In spite of the difficulties which you have brought out, we shall have completed the basic modernisation of the Region by 1967, making it thoroughly up-to-date and able to cope with the transport problems of the next decade.

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## MAINTENANCE OF SR MULTIPLE-UNITS

**Concluded from page 157**

shop and the occasional heavy motor repair was carried out by London Transport or by a private repairer. It therefore follows that very little in the way of motor repairs is done by Southern Region's Chief Mechanical & Electrical Engineer's staff, apart from a general strip and clean and commutator skimming. As for contactors, relays, etc., the greater part of the equipment on the Brighton stock, now being scrapped after over 30 years of service, has probably never been removed.

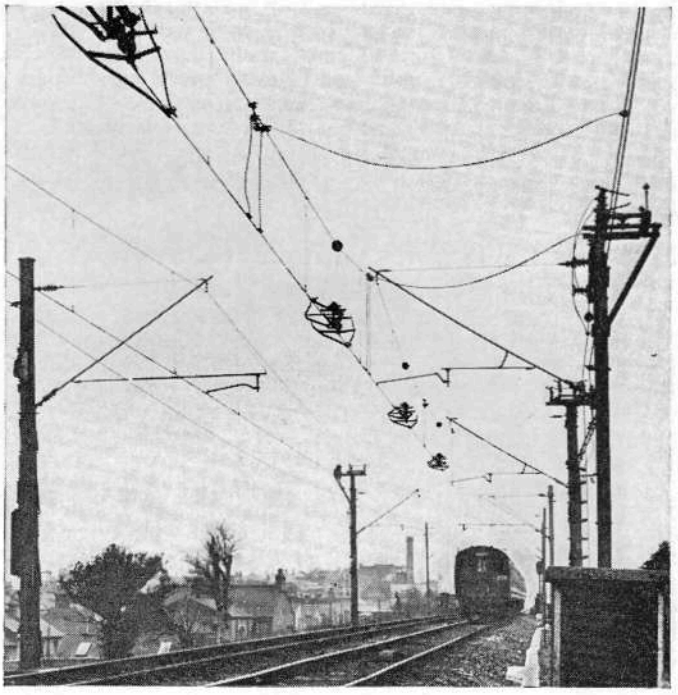
It is sometimes suggested that this policy would be better described as systematic neglect and that is by no means inaccurate. The equipment must be adequate in the first place and there is a price to pay for that; but over a term of 30 or more years, an increase in first cost is amply repaid by savings in maintenance.

There is therefore no shop on regular and sustained contactor overhaul, despite the thousands installed. Later builds of equipment may well prove to be less robust, as the emphasis nowadays is on low first cost, but the first of the 1951-type stock has now completed over 10 years of running and the only signs of trouble, sufficient to justify more than change of contactor tips, is wear on a hinge-pin on some of them. After 10 years, consideration is now being given to some overhaul work.

On the mechanical side, units are shopped on a mileage basis, mostly at 100,000 miles, for a strip-down of mechanical parts (including the components of the air-brake system), inspection, renewal as necessary and re-assembly. Air brake system components are stripped, cleaned and re-assembled and bench-tested.

Day-to-day casual attention is given to bodywork largely where required and staff are available at Inspection Sheds and at major termini and berthing points. A varnishing programme is carried out in the London area and intermediate and heavy bodywork overhaul is carried out at Eastleigh.

# NEW TYPE OF NEUTRAL SECTION SAVES BR £400,000 IN AC COSTS



**Right:** A neutral section on the GE Line 25kV a.c. electrification. This early type involved four section insulators, was 120ft long and could not be traversed at more than 60 m.p.h.

**Below left:** Neutral sections on high-speed lines formerly used air-gap insulation. They were complicated structures 270ft long, which required feeder connections to the dead sections.

**Below right:** The latest type of neutral section, comprising two ceramic-collar insulators 15ft apart, which can be mounted on a standard cantilever mast. The latest lightweight section insulators with glass fibre in place of porcelain can be traversed at up to 100 m.p.h.

ALL through passenger traffic, with the exception of the "Royal Scot" and "Mid-day Scot", is now electrically hauled over the LMR West Coast main line between Crewe and Rugby, following completion of 25kV a.c. electrification between Stafford and Rugby. For the first time under full commercial conditions a new design of short neutral section has been standardised on the Stafford–Rugby section. These sections comprise resin-bonded glass fibre rods inserted in the line of the contact wire. The glass fibre has both the mechanical strength to withstand the tension imposed and the insulating properties necessary to provide electrical separation between the phases. Over the glass fibre rods are fitted high strength ceramic beads spaced by PTFE discs. The beads resist the abrasive action of the pantograph; the PTFE provides a degree of flexibility.

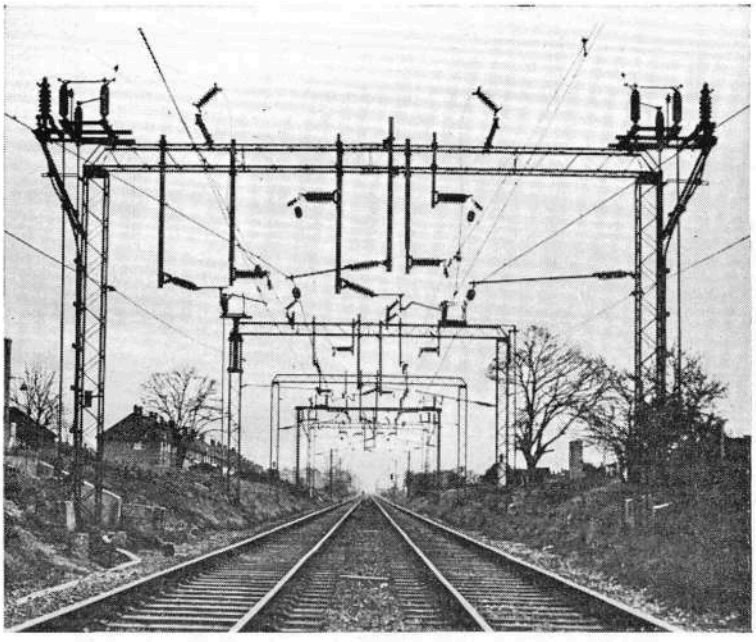
This new form of insulation has been developed by the Accessories Division of BICC in co-operation with British Railways. Being very little heavier than the contact wire it replaces, it enables trains to travel through neutral sections at up to 100 m.p.h. with smooth resumption of current collection in either direction. An additional advantage is that it is substantially cheaper than the type previously used.

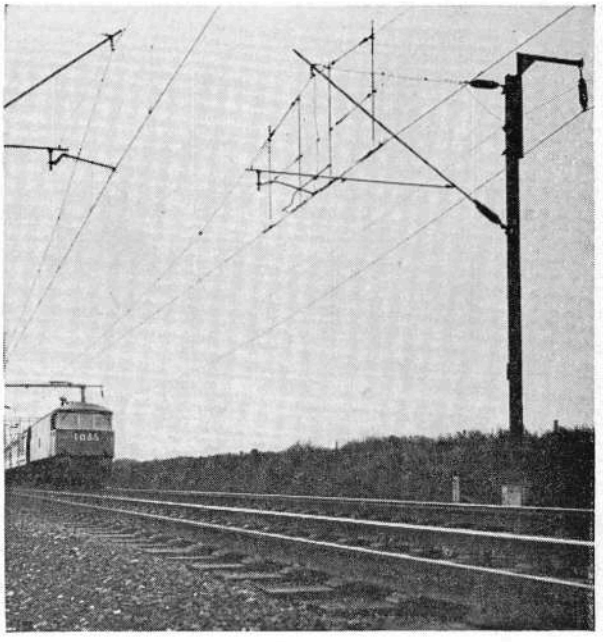
A complete neutral section now consists of two sets of insulation inserted in the overhead line about 15ft apart, with the equipment between them at earth potential; the whole structure can be mounted on a standard cantilever mast without additional strengthening. Previous neutral sections, in contrast, were extremely complicated structures at least 120ft long, which required costly feeder connections and switchgear in case trains came to rest in the dead section.

By using this new type of neutral section for the southern half of the LMR's 25kV main line, British Railways expect to save approximately £400,000. Exhaustive tests of prototypes under arduous climatic conditions on high-speed routes carrying intensive steam, diesel and electric traction services have already proved the durability of the new arrangement. It will later replace existing neutral sections on all BR 25kV lines.

Glass fibre insulators were first used by BICC in Australia for a 1,500V d.c. electrification scheme completed in 1955 and proved completely satisfactory without additional protection. But when they were tested at high a.c. voltages in England's damp and polluted atmosphere, it was found that surface tracking quickly impaired their insulating properties. The surface was therefore protected with a sleeve of polytetrafluoroethylene (PTFE) sealed to the end-ferrules and the annular space between rod and sleeve was filled with silicone grease to prevent moisture penetrating. The resulting insulators weigh only 2 lb compared with 35 lb for an equivalent porcelain insulator and greatly improve the dynamic performance of overhead equipment, especially where train speeds are high.

Nevertheless, PTFE cannot withstand the abrasion of a current-collecting pantograph and in the last two applications mentioned above it has to be protected by toughened-glass runners. These have now been eliminated by the development of the latest ceramic-collar insulator, which can withstand direct contact with the pantograph. In this, the cylindrical collars are located symmetrically





about the central glass-fibre rod by spacers made of a fluorocarbon resin, which also prevent the formation of a continuous carbon track. The gaps between the collars, rod and spacers are filled with a solvent-free silicone rubber paste, applied under vacuum. This seals the assembly from moisture and provides a resilient layer to distribute evenly the stresses caused by passage of the pantograph.

Adjustable runners attached to the insulator at the connections with the contact wire smooth the transition of the pantograph from one to the other and protect the terminations from wear. These runners also form part of an arc-diverting device, which prevents damage to the overhead equipment if a power arc occurs. Normally, however, power arcs are prevented, with these as with other neutral sections, by magnetic inductors on the track which cause the main circuit-breaker on the train to open just before the neutral section and to close again afterwards.

British Railways' 25kV lines use a single-phase power supply at the industrial frequency, 50 c/sec, but this is derived from a three-phase public supply. In order to ensure a reasonable balance between phases, adjacent sections of the overhead line are fed through step-down transformers connected to different phases of the public supply. The sections are about 20–30 miles long, fed from the mid-point, and are insulated from one another by neutral sections. Switchgear in an adjacent cabin enables the neutral section to be by-passed, and two sections of line coupled up, if the power supply to one of them should fail.

Neutral sections must be long enough not to be bridged by any arrangement of pantographs on the trains using the route. In 1956, when 25kV electrification was introduced, the ultimate BR pantograph arrangements were not determined. The first neutral sections were therefore made at least 120 ft long and divided into three parts, insulated from one another as well as from the live sections, to cover every possibility.

On most suburban lines, neutral sections were formed by inserting in the overhead line four section insulators with porcelain insulation and copper runners for the pantograph. Owing to their weight, however, these were not suitable where train speeds exceeded 60 m.p.h. Air-gap insulation was therefore adopted at first for high-speed lines. This made use of a second set of overhead equipment, unenergised, running parallel with the first and 2ft from it; one set of equipment was in contact with the pantograph while the other was taken up to porcelain insulators, and vice versa. The complete neutral section had to be 270ft long to give acceptable dynamic performance at train speeds of 100 m.p.h. Later, the development of light glass-fibre section insulators with toughened-glass runners enabled the shorter type of neutral section to be used on any line.

All these neutral sections required careful siting in relation to gradients and signals so as to minimise the chances of a train coming to rest in the dead section. This often meant placing them away from their associated switching station, which necessitated long and costly cable connections. In case a train did come to rest, there had to be feeder connections to the three dead sections and switchgear remotely operated from a central control room.

Now British Railways have standardised a single pantograph on all locomotives and motor-coaches, so that neutral sections need be only 15ft long, with a single dead section. At the same time the development of the lightweight ceramic-collar insulator has made such sections dynamically possible, even on high-speed lines. These new sections can usually be sited near their switching station without difficulty and require no feeder connections to the dead section because the chance of a train stopping there is remote.

# the Irish scene

Edited by L. Hyland

## CIE

A TRIAL train was run from Dublin to Cork on January 18, apparently to establish the capability of two General Motors locomotives with a light train; this may well be a prelude to an accelerated service on the main line next summer. The train, composed of Nos. B162 and B156 with five Cravens-type second-class coaches and two vans, left Kingsbridge at 12.30 and completed the 165¼-mile journey in 2hr 31min. A similar timing was recorded in the up direction the same evening. There was no relaxation of the speed limits. The overall maximum permitted is 70 m.p.h. but there are six sections, totalling 48 miles, on which 75 m.p.h. is allowed. Offsetting this, however, are the permanent restrictions to 60 or even 50 m.p.h. at seven points en route. Taking this and the inherent difficulties of a main line so steeply graded out of each terminal, the average speed of 65.6 was very creditable. A regular scheduled time of 2hr 45min seems feasible, provided that the load of the train is kept within rigid limits. This timing still falls short of the minimum city-to-city time by air of 2hr 5min, but is currently in competition with a rather uninspired air timetable.

Locomotive No. K801, the MAK 800 h.p. locomotive which was acquired from the GNR, left Inchicore works after repairs last December to resume its duties based on Cork shed. It failed en route at Sallins and was towed back to Inchicore, where it still remains. The erstwhile SL & NCR railcar, now No. 2509, is still in use on driver-training duties. A steam locomotive whistle has been fitted experimentally to an A class diesel following complaints from goods guards of the inaudibility of the normal warning device.

The modernisation of the booking hall of Glanmire Road station at Cork is now complete and on January 4 Almex ticket machines were introduced, bringing the booking arrangements into line with those at Dublin Kingsbridge. The booking hall presents a clean modern appearance, with a green-and-white tiled floor and varnished timber walls. A new enquiry office has been established in what was formerly the stationmaster's office. The buffet is also being modernised, but this will not involve any alterations in the display of railway crests established there in 1960.

New traffic is anticipated from the development of mines at Silvermines, close to the Ballybrophy–Nenagh–Limerick line near the former Shalee Halt. The point of export is Foynes and this traffic, if it materialises, should stimulate the 9½-mile Ballingrane–Foynes branch.

## UTA

The closure of the Goraghwood–Newry–Warrenpoint line (10 miles), which took place on January 2–3, was final. There are no Sunday services beyond Newry Edward Street, so the last train to Warrenpoint ran on Saturday, January 2. The following day the last train on the Goraghwood–Newry section was a six-coach railcar formation. The closure was subject to the approval of the Transport Tribunal and this was given on January 16. At the same time the Tribunal sanctioned the much-disputed closure of the Portadown–Londonderry line (with the Dungannon–Coalisland branch) and on January 18 the UTA announced that this would take place after the last trains of February 14. Tyrone County Council again threaten legal proceedings to avert the closure but, up to the time of writing, without effect. With the closure of the Newry and Warrenpoint line main-line trains run non-stop from Dundalk to Portadown and vice versa. Customs examination takes place at Portadown's No. 4 platform.

The works for an approach road to the new Lagan Bridge in Belfast alongside the Queen's Bridge, will interfere with the line from Belfast Central Junction to Ballymacarrett Junction—the link between the Bangor line and the rest of the railway system. Middlepath Street bridge will be removed and this will temporarily sever the line to permit the construction of the new road. It is understood, however, that the severance will not take place until after the July 12 holiday traffic this year.

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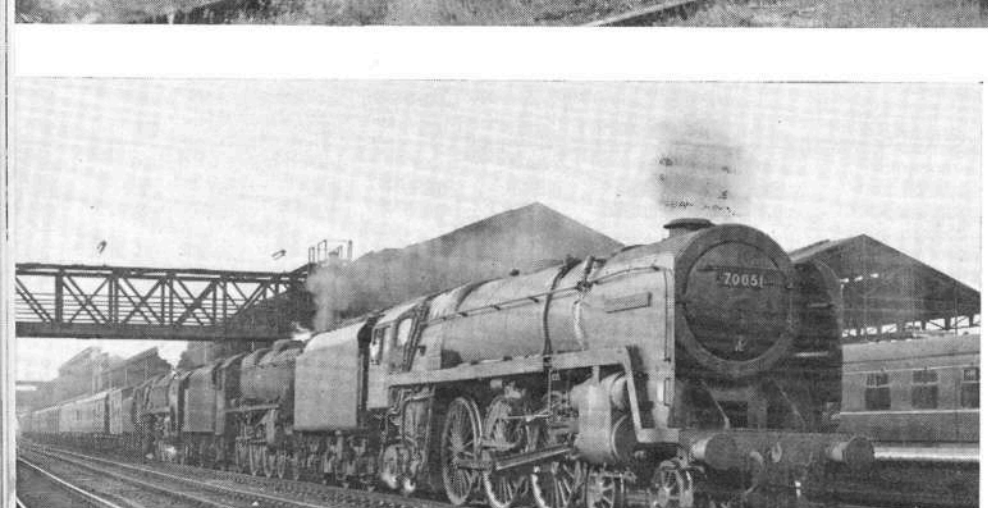
**BR MUST RESPECT THEIR TIMETABLES**

**Concluded from page 122**

commercial nonsense. Regional boundaries are a railway artificiality of no public significance but great inconvenience when, for example, two-thirds of Wales is covered by the LMR book and a third by the WR, and the industrial North is shared by the LMR, ER and NER books. The only logical arrangement is that of one all-line book and a series of local books based on socio-economic boundaries. Finally, it looks futile to persevere with BR timetables of 12 months' duration—otherwise an excellent aim—until the present LMR electrification programme and the reshaping programme is complete.

One postscript: if alteration supplements still prove necessary can they not be made more concise and less perplexing to use? To take some examples from the LMR's January 4 supplement, it is simply making confusion worse confounded to reprint in full an amendment of November 2 to the 18.00 Manchester Piccadilly–Crewe, then promptly cancel that with a new amendment; and why not say that in all entries on page 332 of the original book, Manchester Exchange should be substituted for Manchester Victoria, instead of tediously listing every affected train with a repetition of the one and only alteration? As for a reprinted table 50 that reproduces a train which "runs until October 24, 1964", comment would be superfluous.



## STEAM IN THE NORTH-WEST

**Above:** A Stanier Class 5 4-6-0 accelerates a Southport excursion away from Wigan L & Y in September 1964.

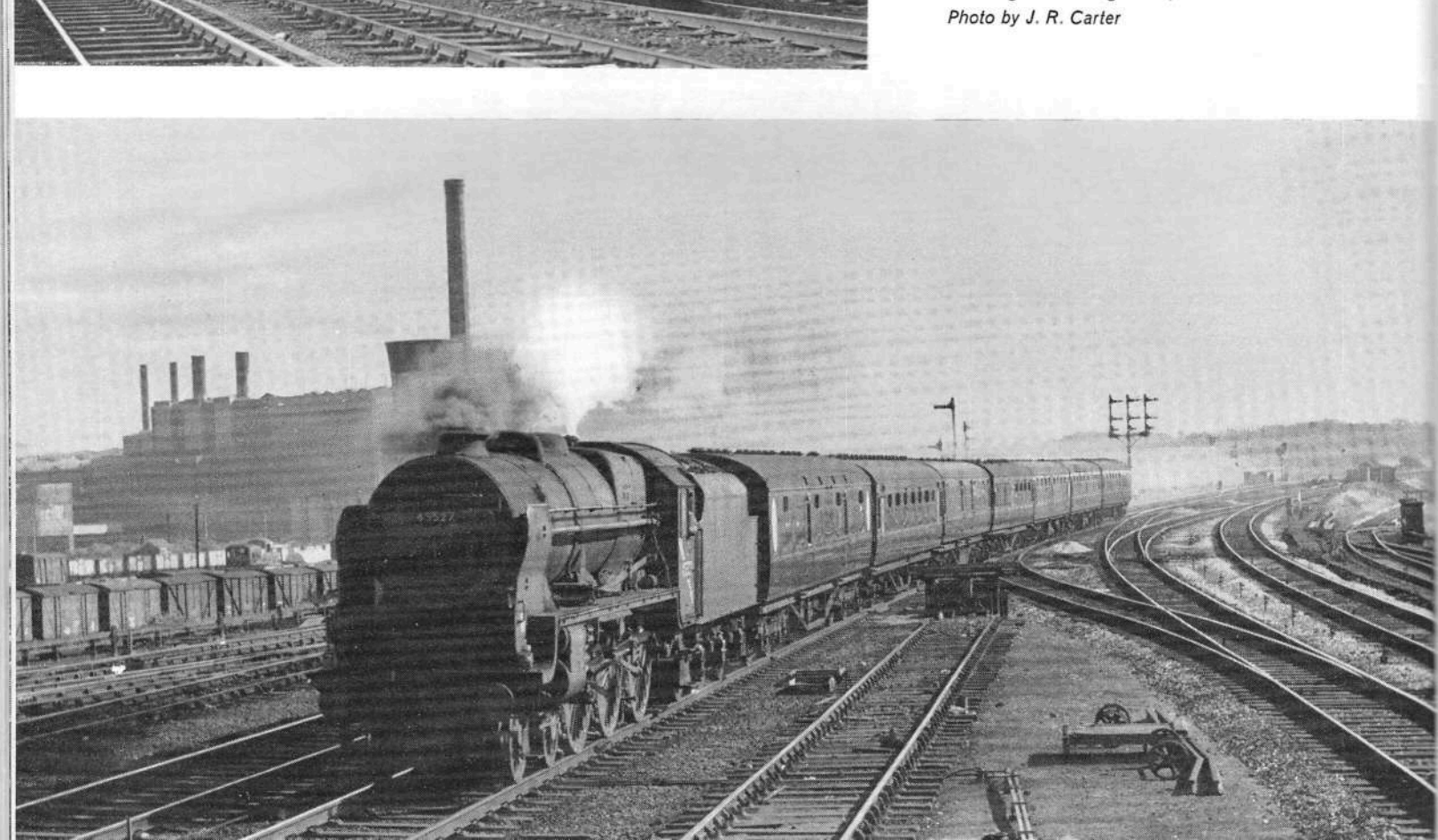
*Photo by C. T. Gifford*

**Left:** Two "Britannia" 4-6-2s, Nos. 70051 *Firth of Forth* and 70019 *Lightning*, flank a Stanier Class 5 4-6-0 at Chester in September 1964.

*Photo by J. R. Carter*

**Below:** Class 7P 4-6-0 No. 45527 *Southport* heads the Friday 20.45 Plymouth–Glasgow through Warrington on August 28, 1964.

*Photo by J. R. Carter*



# today and tomorrow

## THE BR-GPO PARCELS TRAFFIC CONTRACT

THE contract signed by Dr. Beeching and the Postmaster-General on January 15, which secures to BR the bulk of GPO parcels traffic for a 10-year period, subject to provision of a satisfactory standard of rail service, is another astute move typical of BR's new commercial approach. In return for the long-term arrangement, there is a reduction in charges which the BRB intends to offset by higher productivity. The long period enables movement of parcels to be planned in advance, and this includes provision where necessary of cages and other structures and stations for better safeguarding of mails, instead of the present haphazard methods of handling only too obvious to passengers at stations. One benefit from planning will be the choice, or special working, of suitable trains for mails. This will obviate the delays to passenger trains too often caused by movement of large quantities of probably unprogrammed parcels mails, and consequent inability to plan use of manpower and other resources; no doubt, however, local shortages of BR station staff have contributed to unsatisfactory handling. Most GPO letter mails, which in general are handled by GPO staff on railway premises—also with evidence of lack of planning—are carried by BR under separate existing contracts. They also are to continue to go by rail, and payment under these contracts has been increased to reflect changed circumstances since they were last reviewed in 1957. All charges for mail by train are to be adjusted annually in accordance with any movement in an agreed price index. Over 10 years these contracts could afford BR some £250m revenue. For the Post Office and its customers they should mean better service. In 1963 the GPO began its experiment of sending certain parcels mails to, from and within East Anglia by its own road vehicles. The experiment is to be re-assessed in the light of the new contract. It is stated to have cost £390,000 last year, including acquisition of any necessary road vehicles, but the amount saved, in comparison with rail movement of the same amount of mail over the same period, has not been divulged. Over 90 road vehicles are employed. If the East Anglian experiment is found not to be financially justified, these vehicles can easily be allocated to postal work elsewhere. Nevertheless their acquisition, the appointment of necessary staff and the organisational change have made great demands on GPO resources.

### News traffic on 10-year contract

BR also negotiated in January an agreement with the Newspaper Proprietors' Association which puts newspaper traffic on a ten-year contract basis for the first time. This is expected to yield BR about £60m in revenue over the whole period. The efficiency of the service should be improved because it will facilitate the forward planning of rail services and help to stabilise the newspapers' rail transport costs. Costs should also be reduced because accountancy will be simplified and documentation and checking abolished under the details of the contract. The railways will carry an agreed tonnage of newspapers a year for a lump sum payable by monthly instalments; this annual sum will be varied according to movements of a price index, based on the trends of wages and prices.

### Yet another BR oil contract

Another long-term contract for the bulk transport of oil by rail has been signed by Globe Petroleum Ltd. and BR. It is on the same broad lines as previous contracts. Globe Petroleum at present serve the Midlands, the northern part of England and Scotland through approximately 150 retail outlets. Expansion to national coverage is planned.

### BR sundries service under manufacturers' fire

The quality of BR sundries services was severely criticised early in January by representatives of railway users, notably the National Chamber of Commerce and the Scottish branch of the National Association of British Manufacturers. Complaints related mainly to slow transits of less-than-wagonload traffic, notably of pottery from North Staffordshire, which was the subject of representations by Mr. Ellis Smith, M.P. for Stoke-on-Trent. Replying for BR, Dr. Beeching admitted that there had been delays, but stressed the shortage of staff at large traffic centres, especially to deal with traffic which coincided with heavy consignments of consumer goods at Christmastide. As regards traffic from Scotland, the NABM Scottish branch manager observed that whilst station-to-station traffic between Scotland and England appeared to be satisfactory, delays tended to arise at transit depots. Some Scottish consignors, he said, were despatching goods to large stations in England by rail and arranging for private carriers to pick them up there for delivery. At the time of going to press, the BRB reported that congestion in smalls traffic had eased and had ceased in the case of many flows. Wagonload traffic has not recently been the subject of public criticism.

### Tribunal rejects London season rate increase

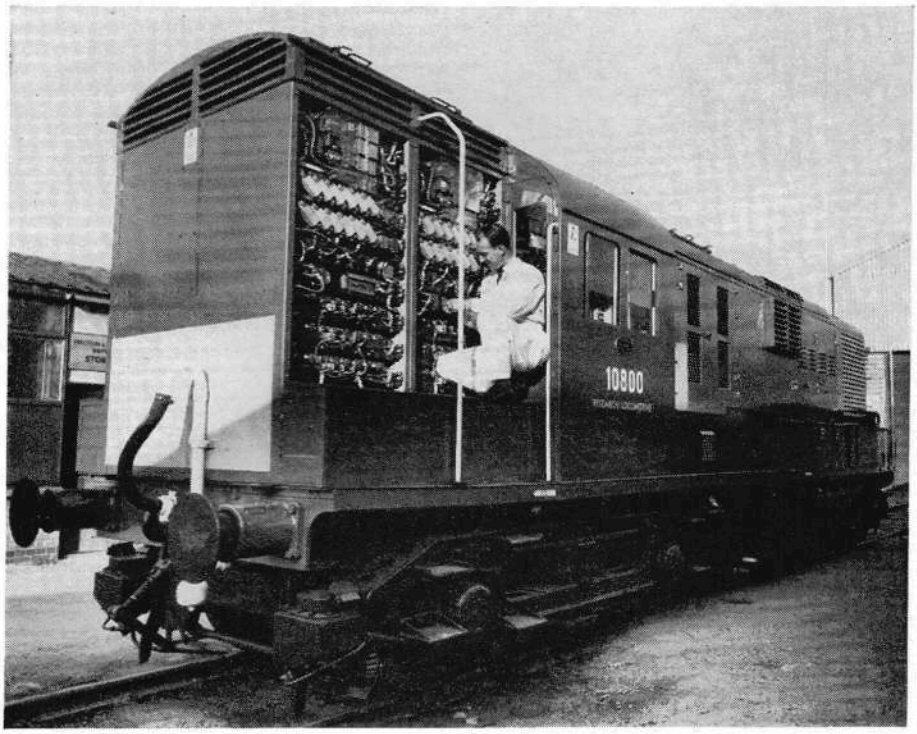
For the first time since 1948 the Transport Tribunal has rejected a BR application for higher fares. Turning down the simultaneous BRB and LTB proposals for a 5 per cent increase in London area season ticket rates, the Tribunal said that higher charges could not be justified only by a need to raise more revenue, which seemed to them the sole purpose of this application. In the Tribunal's view, the 7½ per cent increase of last July, which was approved retrospectively, should have produced a surplus of £1m. a year; the BRB should be able to meet their obligations without the further rise of 5 per cent, expected to yield £660,000 a year. The BRB immediately pointed out, however, that its proposals with regard to London Tilbury line fares were intended to rationalise the fare structure (although the Tribunal had taken the view that increases on this line would have created new anomalies, this time in the fare structures of London Transport). In a statement after publication of the Tribunal's findings the BRB drew attention to December's unexpectedly high 9 per cent wage award to railwaymen, which came after the Tribunal's hearings, and warned that it might now have to make a new application for higher London fares. The Tribunal has accepted the BRB application to abolish cheap-day return fares in the 10-mile radius London area, holding that peak-hour travelling comfort of season ticket-holders, the mainstay of BR's London lines, outweighed concern for a minority who have to travel to work during the peak but whose destinations vary. The BRB is now expected to introduce off-peak tickets with a discount ranging from 5 per cent for journeys up to 10 miles from London's centre, to 35 per cent for 30 miles. A new off-peak ticket from Welwyn Garden City to Kings Cross, for example, will probably cost 7s 6d against the previous day return fare of 9s.

### The Minister takes a hand

At the end of January the Minister of Transport intervened in the BRB-NUR dispute over Liner trains. In a previous meeting between Board and union representatives, Mr. Dunbar, the BRB member responsible for labour relations, is understood to have extended the Board's previous concessions to a guarantee against virtually any redundancy among BR staff through adoption of the "free terminal" concept. The Minister, Mr. Tom Fraser, told NUR representatives that he endorsed the Liner train scheme as proposed by the BRB and no doubt urged them to co-operate in view of the latest Board offer. The union men, however, limited comment to asking for the BRB proposals in writing. In addition to fears of cartage staff redundancy, the NUR is still harping on the theme that to encourage public road hauliers (they have given ground on admission of C Licence lorries to Liner train terminals) to use Liner trains—or Roadrailer trains—for the trunk component of their haul is merely to help the competition. They are also making an issue of the BRB wish to dispense with brake-vans on Liner trains and to have the guard ride on the locomotive. The NUR case, as put to MODERN RAILWAYS, is that it is basically wrong to alter a safety rule almost as old as railways in Britain; that safety will be prejudiced, as a guard cannot see the train so well looking back from a locomotive cab as forward from a van at the rear; and that guards' jobs may be reduced—though this last argument is difficult to fathom.

### Management on British Rail

"The railways are emerging from their slumbers to go out for and win the traffic they want and can handle best. They are getting into this position primarily because of the acceptance throughout the business that to operate in the modern world, management must be positive and be willing to learn modern technique and think in a modern way". This was said on January 11 by Mr. P. H. Shirley, Vice-Chairman of the BRB, in a paper to the Institute of Transport in which he discussed how some of these modern techniques had been applied to BR in the past few years. After the last war, he said, BR, like many other businesses, had tended to move




The experimental Brush "Hawk". It has been rebuilt from the former LMS No. 10800 with an entirely new type of transmission eliminating commutators that has been developed by Brush Electrical Engineering Co. Ltd. in collaboration with BR. This is now to be given further development and tests in the BR Research Laboratories at Rugby. The advantages of eliminating commutators are immense and for the first time an alternative of some promise has been developed. The "Hawk" is powered by a 1,200 h.p. engine. Traction is provided by four squirrel-cage motors energised by a variable frequency a.c. supply. Variable frequency is produced by four thyristor invertors controlled by advanced electronic equipment, which almost entirely replaces the conventional contactor gear. The d.c. supply for the invertors is derived from a 1 mW 100-c/s alternator driven by the 1,500 r.p.m. diesel engine. The output from the alternator is rectified by a three-phase silicon bridge rectifier.

away from recruitment of general management towards super-specialists and the concept of management by committees of specialists. Almost inevitably, these committees became more concerned with functional perfection than economic purpose. There were many exceptions, but in an organisation as vast as the railways they were all too few to prevent the disheartening growth of losses and financial dependence on Government aid. In turn, these losses became accepted as inevitable and helped thereby to inhibit any feeling that they could be reduced. But in the past few years over £200m had been invested, with only £15m advances from the Treasury on capital account. Financial discipline in the matter of stock control, release of surplus assets and credit control had bridged the cash flow gap. A change of this magnitude was partly the product of technical modernisation, but it reflected to a far larger extent the better management of technical resources by the hundreds of managers who controlled them. Recognition that road transport was the proper means of handling most short-journey traffic and that the railway could not afford to move wagons about one at a time to multitudes of destinations had led to closure of many hundreds of small stations and sidings and produced massive savings in wagons, engine power, signalling and manpower. Critical analysis by the managers of their previously accepted diagramming techniques, service structure and operating methods had enabled them to cut their probable future needs for new motive power by about 40 per cent. Large reductions in the coaching fleet had also been made possible. In track and signalling new standards and technical methods were showing major cost improvements with no diminution of safety—the reverse, in fact. Many terminals, which are inherently major consumers of labour, were more productive than they were because improved management had examined staff against workload. Mr. Shirley conceded that there was still much to be done in the field of administration; always the most intractable of costs.

## "People the most valuable asset"

Improvements in BR management methods, said Mr. Shirley, reflected changes in people, who were the most valuable asset in any business. The technique of getting them to want to make their maximum contribution to change and improvement was the essence of top management and its principal source of satisfaction. Once the BRB's objectives had been set and its policy stated, he claimed, strenuous efforts were made to see that as many as possible of the staff were told by verbal communication and personal contact the outline of these policies and their particular effect on each hearer's function. Inevitably, he conceded, the quality of the communication and even the interpretation of central policy varied, but Mr. Shirley thought that the great majority were given a reasonable understanding of the Board's intentions. There was a determined attempt to improve quality of management. This included a standard procedure to measure managers' qualities and the development of succession lists by which appointments to important posts could be integrated with the career development of the individual. A number of job titles had been changed, particularly in the Regional and Divisional spheres where man management and contact with industry and the public was so important. Many people who were formerly "officers" were now "managers". An officer executed, but did not make policy. Management, on the other hand, carried responsibility to contribute to policy, not only of the particular sector being managed, but of the business as a whole. "Numberless examples exist in the railways of people who, a brief year or two ago, regarded themselves as paragons of executive virtue, but who now understand that they are part of the total management and that the decisions which come down to them are often related to the contributions they have made", claimed Mr. Shirley. Management training programmes more and more emphasise the relationship of the specialist to the whole business and the interdependence of one function with all other functions. There was a rapidly developing cross-fertilisation and development of common language between operators, engineers and salesmen, who accepted that they had a common objective.

## Big changes in budgeting

Until not long ago, said Mr. Shirley, budgeting on BR was almost entirely an accounting exercise, carried out largely on the basis of past experience. As managers had little or nothing to do with the preparation of budgets, they could not be held accountable for their achievement. Moreover, the accountants were rarely able to forecast changes in the technical and functional fields. Thus the process became less and less satisfactory as modernisation and other changes developed an unprecedented pace. Nowadays the accountant, except as an administrative agent, was really one of the last people to see the budget. Budgets were prepared from the bottom upwards. Each unit manager was responsible for forecasting the likely physical facts of his responsibility for the coming year, which were then discussed with his superior manager. At each level various parts of the budget were co-ordinated. Regional budgets were therefore the balanced plan for the Region and the final BRB budget was the product of co-ordinating the Regional budgets. The physical facts were turned into money terms by the accountant for each level, so that each manager knew his financial target as well as his physical targets. Money, however, was a derivative, not the prime factor. Whereas in the past managers at lower levels had no budget at all, now they knew their goal and what the financial consequences of their efforts would be, and they could forecast the financial effect of improved performance. They also knew that if they failed to achieve their objective, they would be held to account. "Quite apart from the financial advantages which the Board itself derives," said Mr. Shirley, "the enthusiasm with which the vast majority of managers now discuss their budgets more than justifies the time and effort that has been put into developing these procedures over the last few years."

## Train-heating boiler ignition improved

British Railways have developed a new electrode to ignite train-heating boilers and are to test it thoroughly under service conditions on all Regions before adopting it universally. It is a pre-set double electrode consisting of two parallel rods in a common ceramic body capable of withstanding 10kV. At present two single electrodes are used for ignition purposes on all types of train-heating

boilers and many failures have been caused by either one or the other of the electrodes becoming mis-aligned. Correct alignment of the electrodes is essential. Investigation on the NER indicated that much of the trouble would be eliminated, and maintenance time reduced, if a pre-set double electrode could be used. The device now developed has these advantages over existing arrangements:

- It is pre-set at the bench.
- The need for adjustment after fitting to the boiler has been eliminated.
- An arrangement of locating clamps prevents the electrode from being incorrectly fitted to the different types of boilers.
- Only one standard electrode is required for all types of boilers.

## Fewer diesels for NER in 1965

The MODERN RAILWAYS prediction that the NER would be allocated few new diesel locomotives in the 1965 building programme was confirmed by the Region's General Manager and Chairman, Mr. Arthur Dean, in a signed article appearing in the *Yorkshire Post's* Trade Review in mid-January. Discussing the motive power transition in the NER, Mr. Dean said that a year ago the Region had 840 steam and 235 diesel locomotives, whereas now it had 670 and 264 respectively; but by the end of 1965, although steam power would have been further reduced to 500 locomotives, the total of diesels would reach only 300. On the subject of freight rolling stock, he mentioned that compared with a year ago the NER was carrying 14 per cent more freight in 14 per cent fewer wagons. NER Liner train terminals were being planned for Tyneside, Tees-side, the West Riding and Hull. Concentration of freight facilities was continuing rapidly; the goal was reduction of installations for less than wagonload traffic to a total of eight major and approximately 35 secondary or auxiliary depots. In the concentration of coal distribution, 298 coal depots in the NER had already ceased operation.

## Minister speeds up closure routine

A commonsense desire to expedite rulings on BR passenger service withdrawals and station closures has prompted the Minister of Transport, Mr. Tom Fraser, to demand early particulars of each case instead of waiting for the report of the TUCC concerned. Thus he can detect what, at a January press conference at Preston, he called "obvious non-starters". This should save lengthy discussion on submissions which the Minister is sure to turn down and spare many people and interests groundless fears and feelings outraged in vain. Mr. Fraser declared that his criteria in arriving at a decision included hardship to rail users and the impact of service withdrawals on regional planning. The present Minister sounds as though he may be rather more tender towards users' susceptibilities than was Mr. Marples. As regards the alleged redundancies caused by closures to railwaymen, he has incurred the wrath of at least some NUR members. That union's organ *The Railway Review* referred in a leading article in its January 29 issue to the "extremely strong emotions" being aroused by the continued process of rail and station closures, and urges the Labour Party leadership to take immediate heed, whilst reminding Mr. Fraser and his colleagues that active railway trade unions helped to create the Labour Party and put Labour in power. "The Labour leadership," it threatens "will ignore the growing feelings of disappointment among active railway trade unions at their peril." In fact, Mr. Fraser's ratio of refusals of closure submissions is slower than his predecessor's—five refusals out of twelve submissions to date, against Mr. Marples' 11 out of 155. But many of the earlier submissions to the Conservative Minister were obvious "starters", and his successor would probably have found them so too. Mr. Fraser refused at the Preston conference to be drawn on the subject of electrification from Crewe to Motherwell; the matter, he said must be publicised by BR. He refused consent to the closure of all passenger services on the electrified line between Manchester Victoria and Bury Bolton Street via Prestwich. The service carries some 7,000 passengers a day in each direction, including some 4,000 into and out of Manchester at peak hours. In reaching his decision, he was influenced both by the TUCC conclusion that the closure would cause serious hardship to many displaced rail passengers by reason of the congestion on the corresponding roads, and by the present contribution of the line to the transport system of the SE Lancashire conurbation. He accepted the TUCC view that no hardship would be caused by the closure of the local passenger services between Bradford and Huddersfield via Mirfield and via Halifax. The BRB proposals involve the closure of Low Moor, Cleckheaton, Liversedge, Heckmondwike, Northorpe and Lightcliffe stations. Consent to closure is subject to provision of certain additional bus services to cater for commuters between Northorpe and Bradford. Through services between Bradford and Huddersfield will continue via Halifax. The Minister is still considering the proposals for the Huddersfield–Penistone and Huddersfield–Clayton West services. As might be expected, he consented to withdrawal of the passenger services between Dunstable North and Welwyn Garden City, involving the discontinuance of the Dunstable North–Hatfield service, on condition that certain extra bus services be provided at times of travel to work. A few days previously, Mr. Fraser had announced his consent to withdrawal of passenger train services over the direct line between Southport St. Lukes and Pool Hey Junction via Blowick, a distance of only 1¾ miles. No station closures are involved, but all passenger Southport to Wigan and Manchester Victoria trains are to run via Meols Cop. Where possible, timings will be adjusted to give connections at Southport with electric trains to and from Liverpool.

## The Whitby closure hoax

There was an extraordinary prelude to the official announcement by the NER on January 18 of a firm date for withdrawal of the two Whitby passenger services to which Mr. Marples gave his consent before the General Election. The previous day the Chairman of the Scarborough & Whitby Divisional Labour Party received a letter on House of Commons notepaper, purporting to come from Mr. Stephen Swingler, Joint Parliamentary Secretary to the Ministry of Transport, which indicated a reprieve for these two services. It said that the Minister of Transport would that afternoon make a statement to the effect that he had considered representations made to him by interested bodies and that it had been decided that skeleton services would be maintained on the Whitby–Malton and Whitby–Scarborough lines from March 8 to August 8; the position, this mythical statement was said to continue, would be reviewed at the end of that period. The news was quickly publicised and given prominence in Yorkshire newspapers on the morning of January 18. On that date, however, the NER announced flatly that the passenger train services would be withdrawn from March 8, contingent upon the provision of additional improved bus services, and that 11 intermediate stations between Scarborough and Whitby, and Grosmont and Malton, would be shut to passenger services; there would also be some consequential alterations to the rail service between Malton and York. It was now plain that the original letter was a clever and elaborately executed hoax. It has been sent to Scotland Yard, where, apart from endeavouring to establish the identity of the perpetrator, police were concerned to trace how he came into possession of official House of Commons notepaper. Despite a reaffirmation that the Minister of Transport has no intention of taking any further action to rescind the Whitby closures, local effort to save the services persists. A Whitby all-Party Action Committee has sent every Labour MP a copy of an advertisement published by the local Labour Party during the last General Election campaign, which reproduced Labour's pledge that the Whitby closures would be halted if they were returned to power. Additionally, the sitting Conser-

A number of Brush 2,750 h.p. Type 4 diesel-electrics are now in service equipped with the Hawker-Siddeley slow-speed control for merry-go-round working, in which the trains will be kept moving at minimal speed throughout the automatically-controlled bottom-door discharge of coal into bunkers at the power stations. This view of a Type 4 control desk shows the slow-speed indicator at the top of the picture and the driver's fine control resistor in the foreground. The latter varies the main generator exciter field current and gives fine control of speed up to 3 m.p.h. During this slow-speed operation the driver's power handle is left in the quarter power position. In addition to feeding the speed indicators, an electronic converter provides a signal to operate the field diversion contactors, which operate at fixed speeds. A further development to be fitted to later Type 4s provides for automatic slow-speed control to a rate predetermined by the driver. The speedometer, accurate to 0.1 m.p.h., is actuated by a multi-toothed wheel with fixed magnetic pick-up attached to an axle; this gives a signal, the frequency of which is proportioned to the speed, and which is fed through an electronic converter to the cab dial.

vative MP for Scarborough and Whitby, Sir Alec Spearman, announced his intention during February to introduce under the Commons' 10-minute rule a bill empowering the Minister of Transport to rescind previous consents to closure.

## Economies on the St. Albans branch

A new effort to cut the losses on the Watford–St. Albans branch and save its passenger service from closure has been made by the LMR. The service is now being worked by a single two-car diesel multiple-unit shuttling between terminals at a 40min headway; this has reduced rolling stock requirements by a train set. Watford North, Bricket Wood, Park Street & Frogmore and St. Albans Abbey have been converted to unstaffed halts and tickets are now issued on the train by the guard. Track layouts and signalling arrangements are being simplified as a result of the new "one-engine-in-steam" method of working. It is hoped that these moves will eliminate most of the £24,000 annual deficit on this service.

## Another Midland passenger survey

Passengers on main-line trains between St. Pancras and the North were subjected to another passenger survey in mid-January. A main objective of this latest exercise appears to have been opinion-polling on the service that will be expected on this route after introduction of the new a.c. electric timetable throughout between Euston and the North-West at the beginning of 1966. One question on the form asked bluntly: "Is there any reason why you would wish to continue to use this route after the services between Manchester and Euston had been electrified and speeded up?" Eight teams of three investigators apiece were employed and passengers were invited to complete a four-page form of 29 questions, half of them relating to their current journey and the remainder to more general railway service topics. Some 60,000 questionnaires were distributed during the fortnight's duration of the survey.

## LMR services withdrawn

The LMR withdrew several passenger services during January. They were: on January 4, Leek–Uttoxeter; and on January 18, Nuneaton–Coventry–Leamington Spa, Walsall–Rugeley TV, Birmingham New Street –Penns–Walsall, Wolverhampton HL–Walsall–Burton-on-Trent, Whitchurch–Welshpool, Llanymynech–Llanfyllin, and Ruabon–Barmouth and the Bala branch.

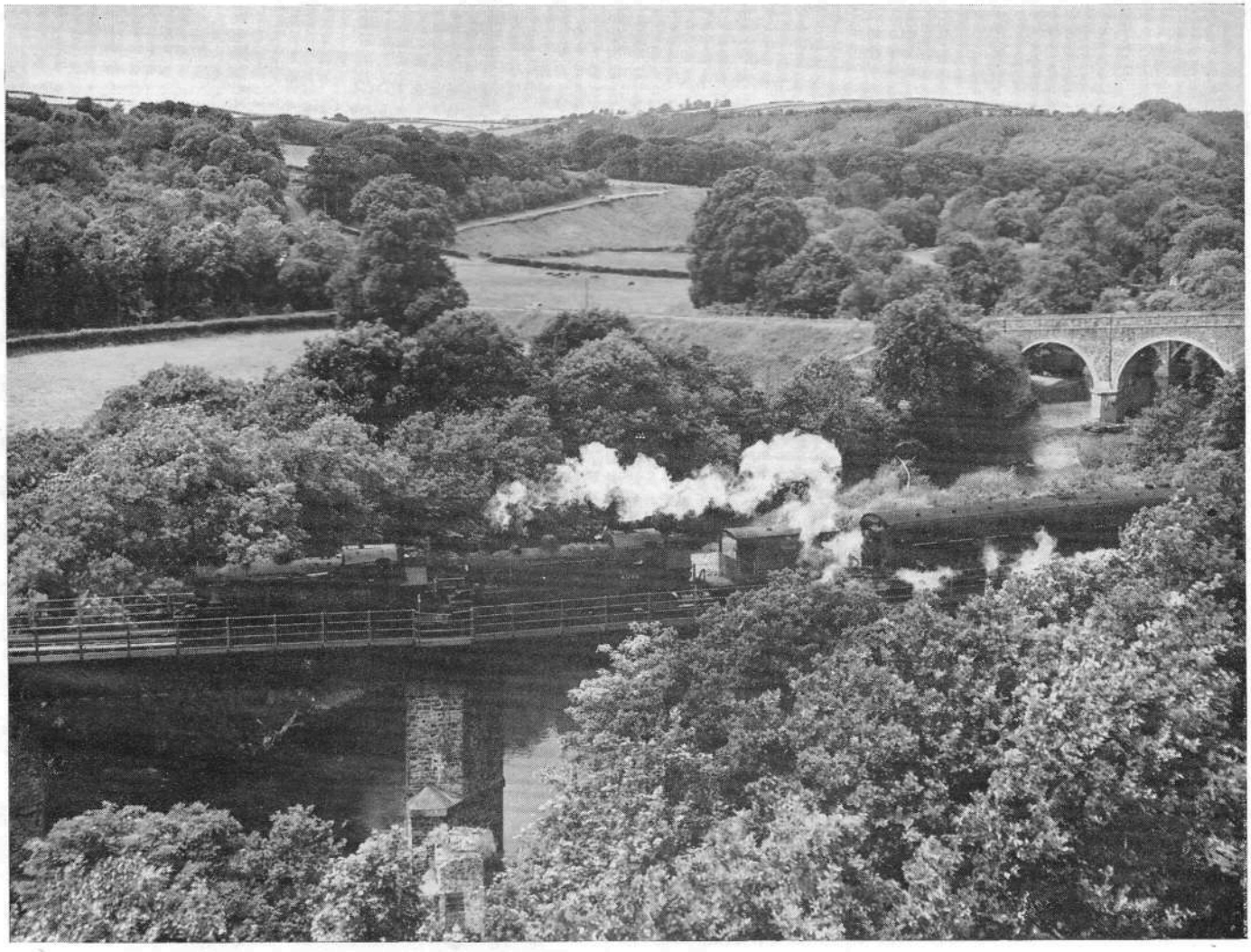
## Aggressive NER publicity

A battle of the billboards is warming up just outside Darlington. At the foot of its Darlington–Thornaby–Middlesbrough line embankment the NER has set up a large hoarding facing the entrance to Middleton St. George airfield, from which BKS have recently launched a Tees-side–London air service. "London by train—only 3hr 26min from Darlington—try it next time" is the injunction confronting air passengers. It is reported that the air interests are to retaliate with a "Go by air" billboard in the vicinity of the East Coast main line.

## The strength of air competition

The BRB's diffidence about the durability of rail passenger traffic between the South of England and Scotland looks more coldly realistic with each summer's announcements of new airline plans. From April 1 to October 23 over a million seats will be available on scheduled flights between London and Scotland, a new record. The frequency offered would do credit to any 100–150 mile rail service from London to a provincial city. With the addition of one more flight by comparison with last summer, BEA's 126–132 seat Vanguards will be leaving Renfrew Airport (Glasgow) for London on weekdays at 7.30, 8.00, 9.00, 10.10, 11.40, 13.00, 15.15, 16.50, 17.40, 19.00, 20.20 and 23.25. British Eagle will be sending off 102-seat Britannias at 7.45 and 17.30. In addition, BEA will run an Aberdeen–London service and eight Vanguard flights a day from Edinburgh (Turnhouse airport) to London, British Eagle

The WR withdrew passenger services between Torrington and Halwill on March 1, but the branch remains open for clay traffic from the quarries between Torrington and Hatherleigh; the present standard-gauge line was built in 1925 to replace a narrow-gauge railway originally built for the transport of clay. Class 2 2-6-2Ts Nos. 41216 and 41283 were photographed near Torrington with a Halwill line mixed train.
*Photo by J. C. Beckett*



will have one Edinburgh–London flight each weekday and BUA will be operating a Renfrew–Gatwick service daily for through passengers to the Continent only. As for the long-term, it has been forecast that a civil version of the Short Belfast, carrying at least 280 passengers, could cut London–Scotland air operating costs per seat-mile by 20 per cent in comparison with the Vanguard.

## Go-ahead for more SR push-and-pull?

The adaptation of obsolescent SR electric multiple-unit stock for peak-hour diesel locomotive push-and-pull workings, first forecast in the March 1964 MODERN RAILWAYS, is to be put in hand at Eastleigh, according to a correspondent. The object, it will be recalled, is not only to achieve more flexibility of traction but also to save the provision of new coaching stock, by using, for limited peak-hour additional workings only, vehicles that are no longer suitable for regular employment but which are capable of less rigorous use for some while longer. The push-and-pull sets are for the Oxted line and each will comprise two ex-Portsmouth express motor coaches and four ex-Brighton express trailers.

## Advance Continental booking simplified

Individual bookings for seats or couchettes on trains from London or the Continental ports can now be accepted up to six months in advance, as a result of negotiations between the SR and Continental railways. This means the end of the "36-day rule", which prevented individual bookings from being confirmed until a few days before the journey. Bookings sought earlier than six weeks in advance of travel must be made by post to the Continental Enquiry Office at Victoria station, SR, or through any appointed British Rail Travel Agent. A deposit of £1 for each passenger will be refunded when tickets are purchased. Passengers are being asked to confirm bookings at least six weeks before their departure. If the bookings are cancelled more than six weeks before travel, 10s of the deposit will be refunded, but after that time the deposit will be forfeited. From May 1, individual tourists will no longer have to call at the nearest station to their holiday centre on the Continent to book seats for the return journey. These seats—and others for journeys between stations on the Continent—can be booked by means of a simple order form available from Victoria or travel agents from that date.

## Fawley–Croydon block fuel trains

The first block trains of fuel oil from Fawley arrived at Waddon Marsh, near Croydon, in January with supplies for one of the most powerful gas turbines in the country. The Croydon B power station will soon be synchronised to supply the National Grid with immediate extra electric power in the event of severe weather. Britain has pioneered this type of gas-turbine plant, which uses a modified version of the jet aircraft engine. It can be run up and fully loaded in a few minutes by a push-button mechanism and will therefore be invaluable for meeting peak demands. The two storage tanks at Waddon Marsh, which supply the Croydon power station, each hold 16,000 tons of kerosene, and during peak periods 150 tons an hour will be consumed. The SR expects to run at least one block train a day during bad weather, each carrying about 500 tons of fuel. The train runs overnight direct from Fawley to Waddon for unloading in CEGB's newly laid-out sidings. There will be a delivery of one train load a week in off-peak periods and also during the stocking-up time until the new system is introduced.

## Queen Street development off

A £6m BR scheme to redevelop the area of Glasgow Queen Street station has been abandoned because it no longer promises to bring in the revenue originally predicted. This decision was communicated to Glasgow Corporation by Mr. P. H. Shirley, Vice-Chairman of the BRB and Chairman of Railway Sites Ltd., in mid January. Replacement of the adjoining BT hotel is no longer contemplated, although the existing building may be extended, and a face-lift for the hotel and modernisation of Queen Street station will probably be the limit of BR redevelopment in the locality.

## Car traffic boom at Bathgate

The growth of traffic in new cars to and from the Scottish Region's Bathgate railhead has begun to tax the parking capacity in the vicinity. On January 19, for the first time, a cargo of 80 BMC cars from King's Norton, Birmingham, was run to Gorgie Sidings, Edinburgh for unloading. During the past year BR received at Bathgate more than 30,000 vehicles from a variety of points including Morris Cowley, Luton, Dagenham, Halewood and King's Norton, compared with only 8,000 in 1963. During 1964 Bathgate also despatched more than 5,000 vehicles, about double the total for the previous year. The car collection and delivery service at Bathgate commenced in October, 1962, and initially one car-train was received weekly. The average is now 14 a week. The trains are unloaded by employees of the car collection companies, of which there are now five in business at Bathgate. Each firm has its own storage depot near the station. The companies forwarding and receiving vehicles include BMC, the Motor Vehicle Collection Co., Tolemans Delivery Service (Ford), Anglo-Scottish Car Delivery and Kennings Ltd. The "Imp Specials" from Johnstone also flourished during 1964. Well over 12,500 cars were despatched to English destinations during the year and over 5,000 were received. This compared with 6,600 cars despatched and 1,700 received during the nine months in 1963 when the traffic began operation.

## New Continental depot at Stratford

The BRB has authorised the Eastern Region to start detailed planning of a new Continental freight terminal at Stratford. Forwarding Agents will be associated with the scheme. It is intended that a Liner train depot will be built alongside.

## Staff trouble on a.c. lines

Serious unrest is reported among the maintenance staffs of the LMR's electric traction depots at Liverpool Allerton, Manchester Longsight, Crewe and Rugby. The men are demanding higher status and pay comparable with that of similarly proficient staff in private industry and craftsmen in BR workshops. Inequalities in this respect may be highlighted when the fifth new depot is opened at Willesden, in the heart of an engineering industry district. They object that the grade of fitter is not appropriate to the highly skilled electrical engineering work involved in the upkeep of electric traction and urge creation of a new designation of "electrical mechanical fitter". Their dispute—which there is talk of taking to the length of guerrilla strikes—seems to be as much with unions as with BR.

## Plus ça change . . .

On January 13, we have it on the highest authority, the repair list of the WR's Old Oak Common depot showed Brush Type 4 diesel No. D1689 as out of action with a "collapsed brick arch".

# NEWS IN BRIEF

The "British Rail" exhibition, like its BR "New Face" predecessor in the spring of 1963, has set new attendance records at London's Design Centre; on January 6 the day's visitors totalled 6,243, the highest ever counted, and the 28,524 attendance for the whole of the first week was unprecedented.

BR are offering fewer camping coach sites this summer, either because some of the vehicles are no longer economic to maintain or they are located on branches now closed, and some of the older four- and eight-berth coaches are being withdrawn; coaches are no longer available at NE coastal resorts between Newbiggin-on-Sea, Northumberland, and Hornsea, or in South Wales, Cornwall and Devon.

Since January, BR's XP64 train-set has been operated on the LMR's "Ulster Express" between Euston and Heysham; in March it is to be switched to the WR's Paddington–South Wales service.

The Scottish Region has named the 10.40 Inverness–Kyle of Lochalsh and the 11.10 (formerly 10.30) back "The Hebridean".

Exports to Europe via the Dover-Dunkirk train ferries jumped by 20 per cent last year; in recent weeks the traffic has needed a shuttle service of up to eight sailings a day.

Also booming is passenger traffic to and from Gatwick Airport; last year the SR carried 177,491 passengers by train to the airport, compared with about 80,000 in 1963.

BR and SNCF cross-Channel car ferry tickets can now be purchased on the spot at the BR Travel Centre in London's Lower Regent Street, and at Waterloo, Cannon Street, Charing Cross (where the information office has just been renovated), Brighton, Cliftonville, Eastbourne, Portsmouth and Southampton stations on the SR and some main-line stations on other Regions.

Pullman supplements on the SR, which have not been increased since 1959, were put up on February 1 by amounts ranging from 6d to 1s 6d; rising costs are blamed.

A 125-year succession of stationmasters has ended at Paddington with the appointment of Mr. Charles M. Coxon, formerly Kings Cross deputy stationmaster and then Paddington's parcels agent, as station manager; in addition to traditional stationmaster's duties, he will be responsible for all parcels traffic through Paddington and supervise the entire area out to Old Oak Common, including the West London and Old Oak carriage sidings.

The Scottish Region has begun a four-year programme of long-welding the West Coast main line from Glasgow Central to Gretna via Carstairs, and also its Edinburgh Waverley-Glasgow Queen Street main line; accelerations of express services are forecast after some sections of the work have been completed.

The Metropolitan-Cammell Carriage & Wagon Co. Ltd. has changed its name to Metropolitan-Cammell Ltd., in view of the diversification of its manufacturing activities.

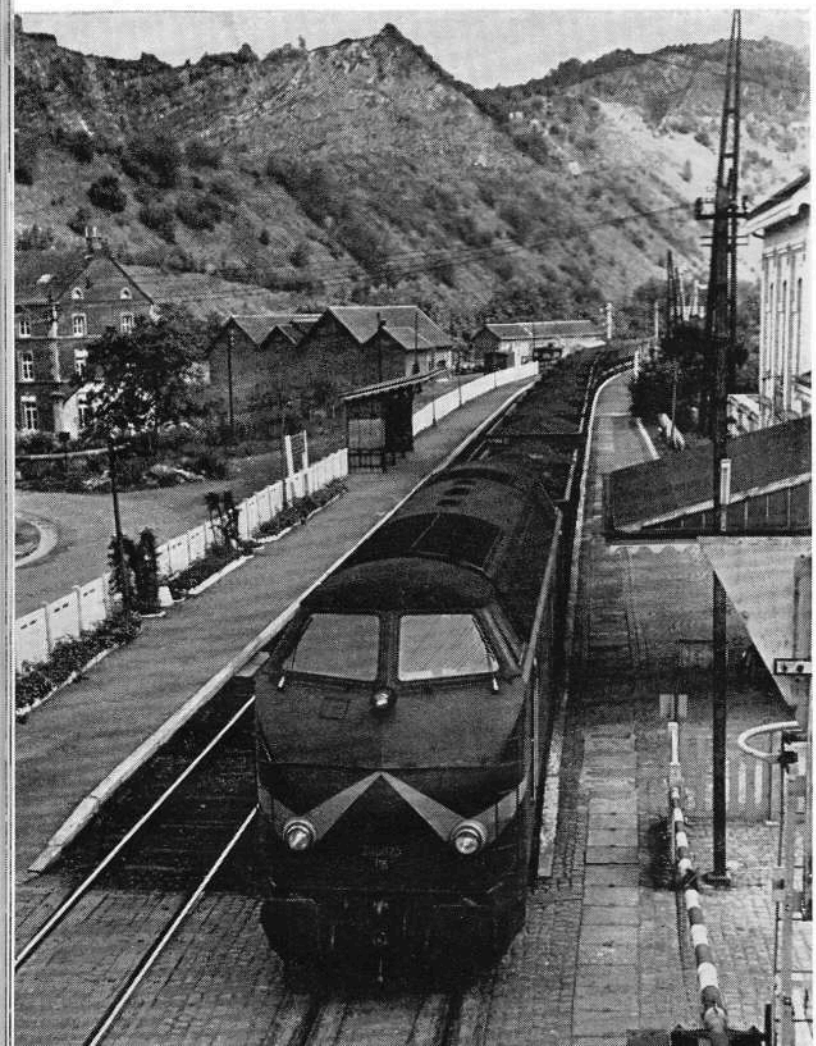
On the WR's Henley-on-Thames branch tickets are now sold at stations only for limited periods of the busiest mornings and at other times are issued on the trains; season tickets can be ordered by post, placing application forms in special boxes at stations, or from any BR destination station.

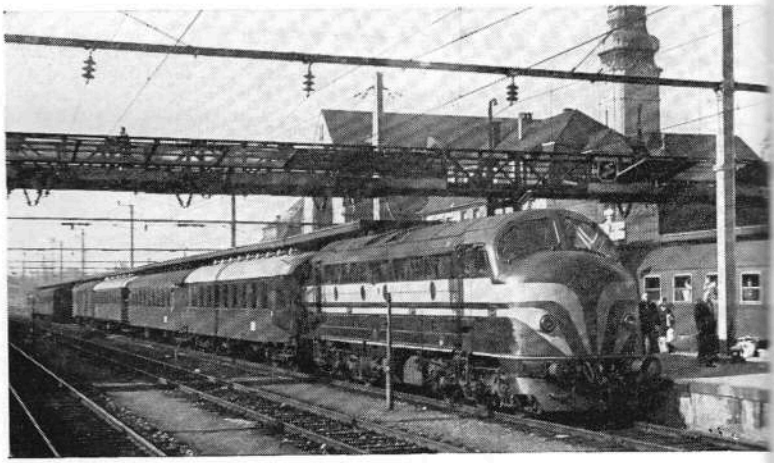
Last month's review of timetable changes erroneously said that all Grantham–Nottingham trains were re-routed to Nottingham Midland, but this is at present happening on Sundays only; complete closure of Nottingham London Road High Level has been proposed by the start of the summer timetable, however.

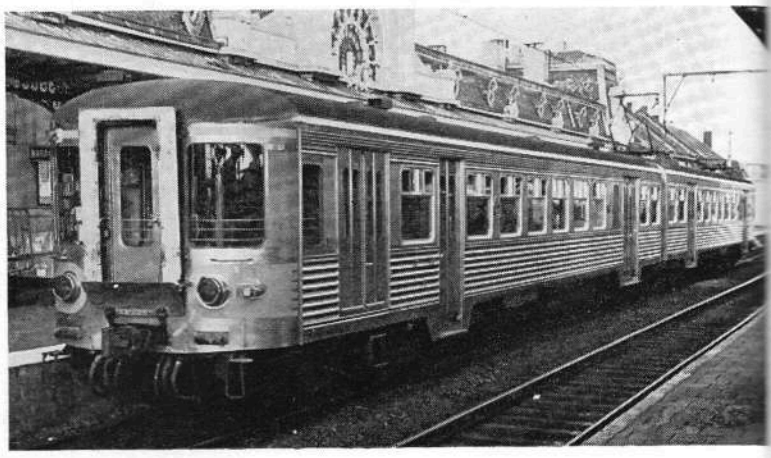
# beyond the Channel

Edited by Paul Drew

The Belgian National Railways have withdrawn their scheme to eliminate steam traction this year. Public opinion has swung in favour of electrification and the SNCB is halting further expenditure on main-line diesel traction for the time being. Here is some of the variety of present SNCB motive power.
**Above:** A Canadian-built 2-8-0, No. 29.117, enters Poulseur with a stopping train on the Liège–Trois Ponts and Luxembourg cross-country line on August 28, 1963.
**Below left:** One of the latest range of diesels built to complete the extinction of steam, a 1,950 h.p. Co-Co built in Belgium by La Brugeoise & Nivelles, passes Poulseur with iron ore for the Liège blast furnaces on August 28, 1963.
**Centre right:** Earlier SNCB main-line diesel electrics are of this General Motors pattern, which was also supplied to the Luxembourg Railways; it is one of the CFL's units that is seen at Luxembourg on August 30, 1963.
**Below right:** One of the newest stainless steel electric multiple-units of the SNCB at Arlon on August 29, 1963. *Photos by A. J. Wheeler*







# FRANCE

## A.c./d.c. locomotives in service

THE first of the 25100 class 4,600/5,000 h.p. a.c./d.c. Bo-Bo locomotives have gone into regular goods and passenger service over the Metz–Neufchâteau–Dijon line. This route is now electrified throughout at 25kV a.c. to a point north of Dijon–Porte–Neuve, where a neutral section separates the a.c. catenary from the 1,500V d.c. system of the Paris–Marseilles main line. Before taking up their present duties, for which they were specifically designed, some of the locomotives had been working between Paris, Dôle and Vallorbe, where there is a similar a.c./d.c. changeover at Dôle. Their transfer to the Metz–Dijon route followed energisation of the final length of a.c. catenary from Chalindrey to Dijon.

One of the 25100 locomotives was illustrated in the August, 1964 issue, page 124, in an article on "French Railways 'Universal' electric locomotives", which included some details of the design. While based on the a.c. 16000 class, the new series has a redesigned transformer with a new insulating technique which allows operation at 15 deg. C. higher temperature and so contributes to a saving of 2 tons in weight. A rotary 32-step tap-changer is fitted and the d.c. resistance control scheme is also designed with 32 steps so that the same power handle in the cab serves for both systems. Rheostatic braking is obtained by moving the handle back past the "O" mark into one of 17 further notches. Braking effort can be increased automatically by means of a deceleration relay, or step by step under manual control. The traction motors are of the same design as those of the 16000 class, but Class H high-temperature insulation is now used for the armature as well as the field coils. This has allowed the continuous current to be raised from 1,040 to 1,200 amps., which largely compensates for the fact that in series-parallel on 1,500V d.c. the machines are fed at 750V instead of the nominal 1,000V supplied to them from the rectifiers when they are in parallel for a.c. operation.

## A single-engined 4,000 h.p. diesel?

A 4,000 h.p. diesel locomotive powered by one engine is now being studied, though none is at present under construction. Good results with the 2,000 h.p. BB67000 and 2,700 h.p. A1A-A1A68000 diesel-electric and the two 4,800 h.p. BB69000 prototype diesel-hydraulic locomotives have convinced the SNCF management that the motive power for heavy loads on non-electrified (and, therefore, less heavily trafficked) main routes should be the most powerful diesel locomotive economically justifiable in the light of the types of traffic offering. Factors to bear in mind are the high capital cost of the 4,000 h.p.-plus locomotive and the ability to work smaller types in multiple. "A small number", it is announced, of diesels of 4,000 h.p. and over are to be ordered this year. They will probably have two 2,000 h.p. engines, as do the BB69000 and the 4,800 h.p. diesel-electric CC70000 prototypes still completing their trials. The type of transmission has not been announced. The BB69000 and the CC70000 can be developed to 5,750 and 5,400 h.p. respectively.

## Future electrification-dieselisation pattern

When the electrification schemes now in progress and planned as reported in previous issues, are completed, 72 per cent of all SNCF traffic will be electrically hauled, but only 23 per cent of the route mileage will be electrified. Apart from probable electrification of the lines to Calais in connection with the Channel Tunnel and individual sections such as Dijon to Bourg, mentioned last month, these are likely to be France's last main-line (as opposed to suburban passenger) electrifications—unless fundamental changes in the pattern of industrial development greatly increase freight traffic flows on sections now in process of dieselisation. Whether the number of heavy loads on the principal non-electrified lines will call for more than a small park of high-power (2,000 h.p., say, and above) diesels is problematical. Big diesels are still a novelty on the SNCF. The total of main-line diesel locomotives as at January 1 is given as 1,140 (against 987 a year previously), but only about 150 machines of 2,000 h.p. and upwards would seem to have been delivered to date. The totals of electric (all sizes) and steam locomotives on January 1 were respectively 2,015 (against 1,926 in 1964) and 2,730 (2,953); and last year electric (including m.u.) and steam traction moved 67 and 24 per cent respectively of the traffic, leaving only 9 per cent by diesel traction of all kinds including railcars. Assuming implementation of the policy of abolishing steam on oft-stated grounds, there is ample scope for line diesel locomotives, if not for the largest types. These last at present have useful fields of activity on the Paris to Mulhouse, Paris to Clermont-Ferrand, and Paris to Cherbourg main lines, but their allocation is possible to many other sections in view of the light axle-loads—only 21 tons even for the BB69000, and this could be reduced by substitution of six-wheel bogies.

## "Mistral" becomes 100 m.p.h. TEE

The long-expected increase of the SNCF maximum speed limit to 160 km.p.h. (100 m.p.h.) has come into force over certain limited sections of the South Eastern Region main line between Paris and Lyons. These are between Dijon and Chagny, 32.2 miles; Chalon-sur-Saône and Tournus, 15.8 miles; and Macon and St. Germain-au-Mont-d'Or, 31.8 miles, this last subject to an 87 m.p.h. through Villefranche-sur-Saône in the down direction only. Allowing for the fact that slower running is required in the immediate vicinity of certain of these stations, the total length of line so covered is a little short of 80 miles, or nearly two-thirds of the distance between Dijon and Lyons. Between Paris and Dijon there is a good deal more curvature, and the short stretches only have been eased to the 100 m.p.h. limit, the longest about 11 miles at the approach to Laroche–Migennes. As yet the only trains authorised since January 26 to travel at the higher speed are the "Mistral", and also between Paris and Dijon the Swiss TEE "Cisalpin". The "Mistral" becomes a TEE with effect from the introduction of the summer timetable on May 30. New sets, presumably similar to those of the Paris–Brussels–Amsterdam TEEs, are to be built; but it is announced that they will not be ready to enter service in May.

## Resignalling at Paris St. Lazare

Since the end of last October the work of No. 2 box at Paris St. Lazare, Western Region, has been taken over by a temporary box built adjacent to it. The old box has been demolished to make way for improvements to the terminal layout in connection with 25kV a.c. electrification to Rouen and Havre. Most of the points in the area are now worked by conventional electric point machines, seeing the end of an unusual method of electrical points operation which was installed when the Nos. 1 and 2 boxes were opened in 1929. Long and awkward runs of rodding, of which some were in tunnels below the tracks, would have involved heavy physical effort in working the points at times of intensive traffic. The signalmen were therefore helped by electric servo-motors under the operating floors of these two boxes. The appropriate motor started when the signalman released the catch of a points lever; it automatically engaged the drive to the rodding and enabled the signalman to throw the lever with very little effort. If the motor failed, the operation could still be completed by the signalman without interruption. This method was adopted because at the time there was hesitation over relying on remotely-controlled point machines at a terminus with so dense a traffic.

## Rheims–Charleville electrification

Completion of electrification at 25kV over the 50 miles from Rheims to Mézières–Charleville affords an all-electric (a.c.) route between Paris and Luxembourg (city) and the Luxembourg/German frontier at Wasserbillig via Rheims, Charleville, Lorguyon and the French/Luxembourg frontier at Longwy. This route carries a heavy freight traffic. As already reported, the DB does not now intend to electrify from Wasserbillig to Trier and Coblenz, as was envisaged a few years ago.

## SNCF investment programme

Both passenger and freight traffic on the SNCF increased by 4 per cent last year compared with 1963. Passenger-miles totalled 24,000m and gross ton-miles of freight 40,000m. If the increase continues at the same rate as it has for the past 10 years, the corresponding figures for 1970 will be 28,000m and 50,000m. The SNCF management stresses that this calls for capital expenditure on an appropriate scale if the traffic is to be moved. The investment programme for 1965 provides as in previous years for continued replacement of steam traction by diesel and electric; passenger and freight stock renewals; adaptation of stations, depots and other installations to present and future needs; and improvement of signalling and telecommunications. Expenditure on rolling stock, estimated at £80m, is to be financed from SNCF resources to the extent of £6m. Twenty per cent of the £50m allocated to electrification work, modernisation of marshalling yards and passenger stations and signalling and telecommunications is to be found from the railway's own resources. The total capital expenditure of £130m planned for the current year is small, the SNCF points out, in relation to last year's traffic. At 0.47d per "traffic unit" (average of passenger-miles plus ton-miles), it is one of the lowest in Europe. Some 55 per cent is to be provided from SNCF funds and the rest by borrowing.

# BELGIUM

## Electrification extension

Electrification at 3,000V d.c. of the 19 miles between Charleroi and the Franco-Belgian frontier station of Jeumont affords electric traction throughout between Paris and Namur, en route to Liège, Aachen, Cologne and the Ruhr. Because of heavy engineering works involved, the 40-mile section from Namur to Liège is unlikely to be completed before 1968, and the Liège–Herbesthal (German frontier) perhaps earlier. Jeumont is the voltage changeover point.

# SWITZERLAND

## Europe's first two-year timetable

The first proof is now available of the Swiss timetables which, in accordance with the arrangement come to at the last European

Timetable Conference, are to operate for two years from May 30 next. In the revision for this longer period, the opportunity has been taken to introduce some of the most revolutionary changes that have taken place in Switzerland for a great many years past. A number of these are connected with the extension of the TEE "Rheingold Express" from Basle to Berne, Lausanne and Geneva, which has been reported in earlier issues.

A new connecting train will leave Berne for the Lötschberg line at 17.21, reaching Interlaken West at 18.33, Kandersteg at 18.31 and Brigue at 19.14—26, 58 and 56min earlier than by the previous connection from Basle. In the reverse direction, the Interlaken connection with the "Rheingold" will start 64min later, at 12.07, and that from Brigue 53min later, at 11.24. Yet another substantial improvement will be that of the express conveying the through Chur–Hook of Holland coach to Basle: this will leave Chur 25min later, at 11.16 and Zurich 14min later, at 13.15. The Engadine will benefit even more, as the connecting Rhaetian train from St. Moritz is to start at 8.35 instead of 7.56, through passengers thus having their journey shortened by 39min. The connecting Rhaetian train from Davos to Landquart also is to start 28min later, at 9.48.

A second TEE alteration of note, to the Zurich–Milan "Gottardo", was described last month. A third TEE train to have a radically altered timing is the eastbound "Lemano", from Geneva to Milan. When the "Cisalpin" came into operation, the departure of the "Lemano" from Geneva was put back to 19.40, in order to avoid having two TEE services at much the same running times between Lausanne and Milan. The later "Lemano" start has not proved popular, however, and it is now to leave Geneva at 15.01, roughly 4½hr earlier, and Lausanne at 15.42, 2¼hr ahead of the "Cisalpin"; the non-stop run from Lausanne to Brigue will continue, and Milan will be reached at 19.15 instead of 23.50.

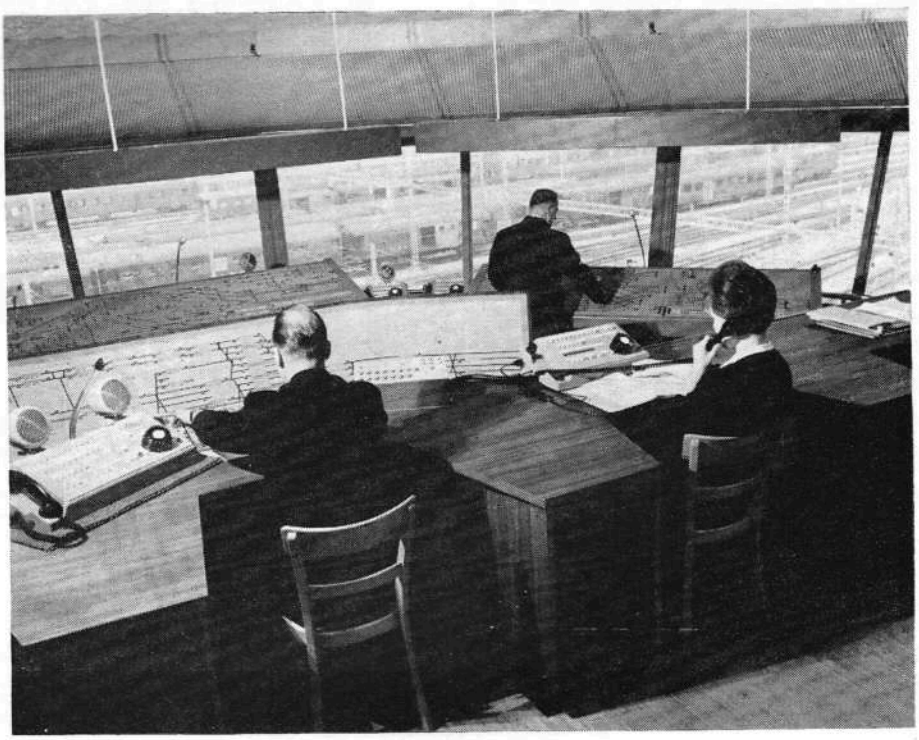
There are to be some important changes on the Gotthard line. The 8.49 from Basle to Milan is to start at 9.50, taking over the title of "Gotthard Express", and the 10.15 from Zurich at 11.18, the two being amalgamated at Chiasso as now and reaching Milan at 16.18 instead of 15.17. The present "Gotthard Express", at 11.37 from Basle, is to start at 11.20 and become the "Metropolitano"; it will still be non-stop from Lucerne to Bellinzona, and will run from Chiasso to Milan independently of the 13.10 (now 13.14) from Zurich, arriving at 17.32, 17min earlier. Northbound, the "Gotthard Express" will start from Milan at 12.00 instead of 11.32, attached as far as Chiasso as now to the midday express which runs non-stop from Bellinzona to Zurich; that city will be reached at 16.56 instead of 16.28, and the "Gotthard Express", with additional stops at Airolo and Flüelen, will be into Lucerne at 17.08 as compared with 16.28 and Basle 40min later, at 18.40. The 13.28 (present 13.30) from Milan will become the northbound "Metropolitano".

As last summer, the night "Riviera Express" is to run from Basle via Berne and the Lötschberg line, with no publicly booked stop between Basle (Badischer) and Brigue, and on from Domodossola via Arona and Alessandria direct to Genoa, avoiding Milan. The same route will be followed in the opposite direction. Of other changes affecting the Lötschberg, the new 17.21 from Berne to Brigue, connecting with the southbound "Rheingold", has been mentioned already. The present connection to that train, at 15.56 from Basle, is to start at 16.07, to have its Olten stop cut from 15 to 4min and that at Berne from 25 to 10min, so reaching Interlaken West at 18.45 instead of 18.59. In the reverse direction the most remarkable feature is a non-stop timing of 57min, the fastest ever, by the 11.24 from Brigue over the 46 miles to Spiez, for an average of 48.4 m.p.h. over a line with a ruling gradient of 1 in 37 and incessant sharp curvature.

On the Basle–Zurich–Chur line the Austrian "Transalpin" from Basle to Vienna is being substantially accelerated, as reported last month. The westbound "Wiener Walzer" sleeping car train, having left Vienna 35min later, at 20.35, will be into Zurich 29min earlier, at 8.18 and Basle 31min earlier, at 9.49, a total acceleration of 66min; the eastbound "Wiener Walzer" is to be 1hr earlier into Vienna, at 8.40.

On the minor lines the most revolutionary development is to be the radical acceleration and amplification by the Visp–Zermatt of its Brigue–Zermatt service, no doubt the result of threatened road competition (*see January issue*). There will be 14 daily trains over the length of the line in each direction instead of 10; the fastest times between Brigue and Zermatt will come down from 90–98min to 73–83min; fast services at entirely new times will be an 11.30 from Brigue to Zermatt, calling only at Visp, and a 15.35 from Zermatt; the "Glacier Express" will call only at Visp on its southbound run.

**Above:** Exterior of the new Swiss Federal signalbox at Berne.
**Below:** Control consoles on the operating floor of the new Berne signalbox.



### New power box at Berne

The new power signalbox at the main station in Berne was brought into use during the night of November 14/15 last. The installation is in two parts, comprising the main cabin with the control room, and an auxiliary cabin. Normally both are occupied but at off-peak periods the main cabin controls all signals.

The operation of the control panel, like all recent Swiss power signalling installations, is from an entrance-exit push-button panel, the operation of two buttons establishing the route for each signal section. For shunting movements, however, the signalmen set the routes from individual point switches. In all, the new installation comprises 69 running signals and 252 shunting signals working in conjunction with 202 turnouts. The entire layout through Berne station has been track-circuited for the automatic control and release of the routes.

For the first time in Switzerland the signalling equipment, for which Siemens & Halske were the contractors, uses pre-fabricated relay and control panel units. At the same time new communications systems have been provided including telephone circuits, loudspeakers and two-way radio communication with shunters on the line. The new box has taken two years to complete and some of the equipment was temporarily arranged for working from the existing signalboxes before the changeover.

Because of the difficulty in locating signal gantries, particularly in the immediate vicinity of the station platforms, over which the new roof forms a raft supporting office buildings, some signals have been suspended from the masts supporting the overhead catenary or from the roof over the platforms. Signal fitters employed on installation work on the line were provided with bright orange coloured clothing to make them more visible to drivers, and the speed of trains through Berne station, whilst work was in progress, was limited to 20 m.p.h. The entire installation was brought into use during the 7hr between 21.30 and 4.30, during which time about 30 freight services or light engines were re-timed or cancelled, and shunting movements reduced to the bare minimum, and some late night and early morning passenger trains were replaced by buses.

## AUSTRIA

### Motorcoaches by car-sleeper

Motorcoaches (besides, as last summer, Landrovers, Dormobiles and other vehicles over the 5ft 10in height limit) can be conveyed by the Austria Travel Agency's weekly car-sleeper trains this summer between Ostend and Villach, in connection with the Belgian Marine Dover–Ostend sailings. Trains will leave Ostend at 15.40 on Sundays from May 30 to September 12, and be due in Villach next day at 10.40; they return from Villach at 17.30 on Fridays from June 4 to October 1, and arrive in Ostend at 14.20. The large vehicles will be carried on DB single-deck wagons. The sleeping and refreshment cars will be DSG and the couchette coaches supplied by the OBB, DB or SNCB. The Agency points out that the trains are not restricted to passengers accompanying road vehicles.

## WESTERN GERMANY

### Indusi train-stopping device

Two-thirds of the DB mileage classified as main lines (about 7,500) are reported to be equipped with the Indusi automatic train-stopping device, which effects automatic application of the brakes if a driver disregards a warning or stop signal. The number of Indusi-equipped motive power units is nearly 3,800, or more than one-third of the total.

### Multi-voltage locomotives

A design is being completed for a multi-voltage DB locomotive, the E210 class, for hauling expresses between German stations and those on railways which use different systems of electrification. Their most likely use is on the routes from Cologne to Aachen, via Herbesthal and Liège and thence to Brussels and Ostend or to Namur and Paris; this involves the German 15,000V, the Belgian 3,000V and the French 25,000V.

## SPAIN

### Madrid-Valencia Talgo trains

The Talgo sets of 1950 recently replaced on the Madrid–Irun/Hendaye service by new Talgo sets and locomotives (*see the December and January issues*) are now running between Madrid Atocha and Valencia via Cuenca (the direct route). The two eastbound trains cover the 252 miles in 5½hr with four stops; westbound, 5min more is allowed. This is much faster than any service on the better-known and longer (306 miles) route via Alcazar, Chinchilla and La Encina, used by locomotive-hauled trains largely because of the possibility of detaching or attaching Cartagena and Alicante portions respectively at the two junctions, and under study for electrification as a branch (from Alcazar) of the Madrid–Cordoba electrified main line.

### Imports by axle-changing wagons

Two factors have enabled the Transfesa company to offer UK consignors direct services of 20-ton capacity wagons to Madrid and Barcelona via the Dover–Dunkirk ferry and Hendaye–Irun (for Madrid) or Cerbère–Port Bou (for Barcelona), with axles changed at the Spanish frontier. Hitherto traffic between Spain and Great Britain by Transfesa wagon has been confined to fruit and vegetables from Spain, because of the need for a quicker turnround (essential to ensure a supply of wagons for movement of perishable crops from Spain) than would previously have been possible if Transfesa wagons were returned loaded instead of empty. The new factors are the agreement by the Spanish authorities to the establishment of inland Customs clearance facilities at Madrid and Barcelona, so avoiding delays at the frontiers, and faster working by the SNCF of southbound loaded wagons from Dunkirk to the Spanish frontiers. Although Transfesa wagons of perishables were and are worked northbound in TEEMs, only southbound empties previously were worked to schedules affording satisfactory turnrounds. Transit time from London to Madrid or Barcelona is five days, and a little longer from the provinces. Traffic from the UK to Spain consists mainly of light machinery and consumer goods, for which through transits without break of gauge are a great advantage.

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# new books

Books reviewed in this feature and published in the United Kingdom are available from Ian Allan Ltd., Mail Order Department, Terminal House, Shepperton, Middlesex at the price shown, plus return postage.

THE SPLENDOUR OF STEAM. By Hamilton Ellis. *Allen & Unwin.* 63s.

This book is as satisfying as a long, cool drink after a summer's-day route march to anyone who has dutifully read or reviewed most of the last year or two's output of railway history. It is the Hamilton Ellis of *The Beauty of Old Trains*, the first and best of his books, untrammelled by a commission to follow a prescribed course through history and pay appropriate homage to the dates and statistics that seem to matter far more to some raconteurs of the railways' past and their critics than the rudiments of a literary style. This is not to suggest that Ellis is anything but an admirable historian. But—with the exception of David L. Smith—he is alone among current railway writers in his ability to recreate in words a lively picture of the pre-grouping atmosphere an increasing number of us never saw. Another age comes alive, for example, in his cameo of "the sombre mystery of Euston at night, with the station full of the mixed accents of Saxon and Gael, the light on the outsides of the gleaming white-panelled carriages, and the glaring gas within them, sometimes shaded by a green cloth cap which people could snap over the lamp when they composed themselves for the long, soporific roar through the night. There were the opulent sleeping cars, wherein people went to bed in civilised fashion, and above all there was the din of surplus steam pouring from Ramsbottom safety valves."

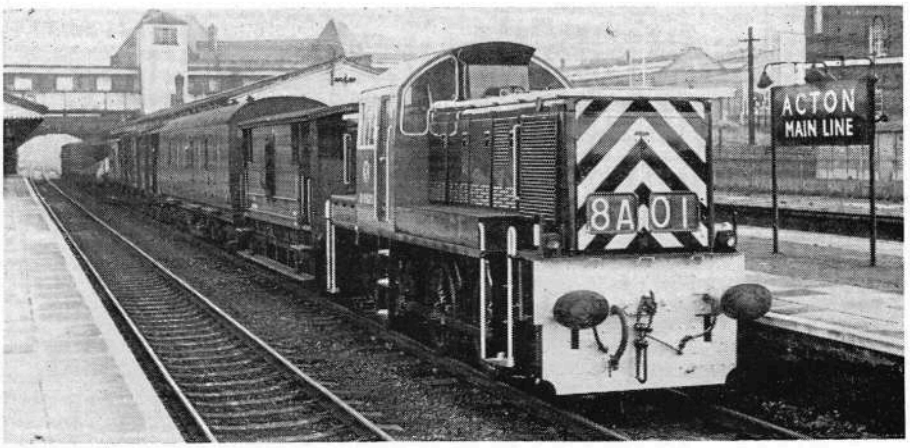
The pictures of this book, however, are only half verbal. It is essentially a collection of 16 of Ellis' colour plates, beautifully reproduced, and a much larger number of his drawings. Round these, which cover a few Continental as well as British subjects, he has woven a series of part-autobiographical essays, in which he tells how he was drawn to tackle the subjects and adds a garnish of relevant history and personal anecdote in vintage Ellis vein.

BRITISH BRANCH LINES. By H. A. Vallance. *Batsford.* 35s.

Throughout this century a staple feature of popular railway periodicals has been the branch line article. Its subject matter has followed a stereotyped format: the manoeuvring to establish a company and the quest for capital; the passage of an Act; construction from ceremonial sod-cutting to completion; a topographical survey of the line from junction to terminal, with precise attention to gradients, mileage and chainage from station to station and provision of sidings, cattle docks and so on; and, finally, its train services. Oddly, to my mind, the train services have often been quite cursorily dismissed by comparison with amount of column inches expended on the preceding topics. Nevertheless, chronicles of this kind have always appealed to a large and absorbed public (is there a similar following for studies of country roads, one wonders?), among whom H. A. Vallance, the recently retired Editor of the *Railway Magazine*, has a justifiably high repute for authenticity and exhaustiveness of treatment. His new book is a collection of studies in the orthodox vein of some 140 branches in England, Wales and Scotland, well supported with maps and illustrations, which is a useful addition to the student's reference bookshelf. **M.N.**

# traffic report

Edited by
G. M. Kichenside




Newcomer to the London Area—Swindon-built 650 h.p. diesel-hydraulic 0-6-0 No. D9521, on crew-training, passes Acton Main Line with the 10.30 Paddington Goods-Acton Yard transfer freight on November 28, 1964. *Photo by A. Swain*

## London Midland

THE official bar on steam power for through workings south of Crewe since January 4 has in practice been marked by a considerable increase in the use of steam locomotives on through passenger and freight trains and on some local services in the London area. This is mainly due to a severe shortage of diesel power arising from failures and locomotives absent under repair. The removal of allocated steam power from Willesden took place on January 3, when no fewer than 16 locomotives worked north light singly or in twos and threes; on the following day, however, the first of the ban, at least 23 steam workings were reported from the Watford area and our correspondent alleges that more steam locomotives have been at work than at any time since before the general introduction of diesel power to booked passenger services. Besides the normal ex-LMS types still permitted various Standard classes were employed, particularly "Britannia" Pacifics, one of which was used as Euston empty stock pilot at least once.

The diesel troubles appear to be mainly affecting the BR/Sulzer Type 2s. During the second week in January at least half the total allocation at Willesden and Camden were out of service undergoing works overhauls or having failed. As a result, steam was employed on a few Euston–Bletchley outer suburban services during the month but the deficiencies were made up by borrowing EE Type 4s from long-distance duties. This in turn resulted in a general shortage of motive power, which had become so serious that some diagrams could be maintained only by immediately appropriating incoming locomotives and cutting turnround times. One of Tinsley's Brush Type 4 diesels, No. D1532, worked up light to Willesden on January 16 but has not since been reported on revenue-earning duties on the Western Lines. As both Bushey and Castlethorpe water troughs are to be taken out of service this month a concerted effort will be needed to restore full diesel working before then.

On January 30 EE Type 4 No. D302 (1A) accompanied by a brake tender worked up to Willesden with a coal train and returned later in the afternoon with an empty wagon train—the first brake tender working to be reported at the southern end of the Western Lines.

Nuneaton shed has also lost its steam allocation and Rugby has received 10 EE Type 4s for London workings. Bletchley, however, retains a few Stanier 2-8-0s for the chalk trains from the Dunstable branch to Rugby, but this traffic will cease when the direct chalk pipe-line is opened between the quarries and Rugby.

Diesel troubles have affected a number of Birmingham area suburban services, particularly the Birmingham–Sutton Coldfield and Birmingham–Walsall lines, where locomotive-hauled trains have replaced defective multiple-units. Both steam and diesel locomotives have been employed on the substitutes; two Fairburn 2-6-4Ts have been allocated to Aston for the duty but Stanier Class 5 4-6-0s from Bescot, Aston and Saltley, and BR/Sulzer Type 2s borrowed from Longsight, Crewe and Willesden have also been used.

On the former GW Birmingham main line Brush Type 4 diesels from Bristol, Cardiff Canton and Landore depots continue to be well in evidence on Paddington–Shrewsbury workings. Old Oak Common members of the class, however, have been noted on the North-and-West main line between Shrewsbury and Hereford, which may be the result of the re-rostering of units at short notice or possibly the introduction of triangular or cyclic diagrams between Shrewsbury, London and Cardiff or Bristol.

Following the official closure of the Ruabon–Barmouth line from January 18 four trains each way between Shrewsbury and Aberystwyth have been diagrammed for diesel multiple-units; the trains concerned are the 8.38, 10.45, 16.16 and 18.45 from Shrewsbury and the 7.35, 10.22, 12.35 and 14.45 from Aberystwyth. The mail trains—the 3.48 from Shrewsbury and the 18.00 return, and the "Cambrian Coast Express" in both directions—remain steam-hauled.

The third round FA Cup ties on January 9 in the West Midlands provided a number of excursions, nearly all of which were steam-powered. Three Shrewsbury–Manchester Piccadilly excursions were surprisingly headed throughout by Shrewsbury's BR Standard Class 5 4-6-0s Nos. 73053/90/5. For the Sheffield United v. Aston Villa match, two excursions from the Birmingham area to Sheffield via the Midland route were powered by "Britannia" Pacifics Nos. 70004/30. Two football excursions for the second round tie between Luton and Gillingham on December 5 were formed of SR 12-car Hastings line diesel multiple-units, which ran via Bromley South, Factory Junction, Clapham Junction, New Kew Junction and Brent to gain the Midland Lines.

Our report in the February issue that Nuneaton Abbey Street had closed and that the new Birmingham–Ely semi-fast service called at Nuneaton Trent Valley was premature in two respects; the closure of Nuneaton Abbey Street has not yet been endorsed by the TUCC and the Birmingham–Ely service will not start until withdrawal of the Rugby–Peterborough service is approved.

The variety of steam motive power on the GC continues; York V2s appear fairly regularly about once a week and are now serviced at Willesden. "Britannia" Pacifics made a number of appearances on the GC line during December and January and among the more unusual visitors have been Standard Class 5 4-6-0s from the Southern and Scottish Regions. The most unexpected arrival, however, was "Clan" Pacific No. 72005, which was first reported heading the 14.38 Marylebone–Nottingham on December 23; the engine was not in very good condition for it was removed at Woodford and returned to London with the same night's 22.53 Woodford–Neasden freight. Nevertheless after only a short turnround it headed north again with the 3.40 Neasden–Woodford freight early on December 24 but its onward progress has not been reported. One of the trains for which Willesden shed is responsible for providing power is the 14.38 Marylebone–Nottingham semi-fast; as reported last month, this turn is now unbalanced and the engine returns south either double-heading the 8.15 from Nottingham or on freight from Woodford. BR/Sulzer Type 2 diesels are now regularly employed between Marylebone and Nottingham on the overnight Manchester trains, but the two diesel-hauled freights between Neasden and Woodford have now reverted to steam with anything from a "Britannia" Pacific to a Class 4 2-6-0.

[For LMR information we are indebted to Messrs. W. H. Dove, M. Wood, D. T. J. Rollason, P. Voake, M. Simpson, D. R. Thornhill, B. J. Billingham, J. A. Norris, M. Clark, A. I. Hinxman, D. J. Crompton, A. Cooper, T. A. Fletcher, B. Shaw, R. S. Fenton, G. Mather, M. J. Cowman and East Warwickshire Locomotive Society.]

## Eastern and North Eastern

Brush Type 4 diesels took over the majority of express passenger diagrams between Liverpool Street and Norwich from January 4, with a consequent improvement in time-keeping. During the first week of the revised workings, for which Nos. D1554-9/62/4-6 were being employed, trains were frequently arriving at intermediate stations before time. The Brush Type 4s, however, are not employed on the boat trains between Liverpool Street and Harwich, for which Brush Type 2s and EE Type 3s are still used. At least two of Stratford's English Electric Type 4s displaced from express passenger work are now employed on freight turns between Whitemoor and Norwich. Unusual power for the 9.15 freight from Whitemoor to Yarmouth on December 14 was BR/

Sulzer Type 4 diesel No. D173 (52A), the first occasion that a member of this class has been reported east of Ely.

Following the withdrawal of the remaining steam power at New England the surviving steam-hauled freights between New England and Hitchin are now powered by March-based Brush Type 2 diesels; Norwich-based members of the class are also employed on diagrams which include GN Line freights. Finsbury Park Brush Type 2s have taken over the remaining steam duties on freight services to Firsby and the Skegness branch. The Brush Type 2 re-equipped with an English Electric 1,470 b.h.p. 12SV engine, No. D5677, has been regularly employed since January 4 on Kings Cross–Cleethorpes trains on which its performance is being assessed before a decision is taken regarding the re-equipment of other members of the class.

From January 9 another section of the GN main line—the 21 miles between Cadwell and Offord—was passed for 100 m.p.h. running. This brings the total of 100 m.p.h. route mileage on the East Coast main line to just over 51; another 42 miles between Skelton Junction, York and Darlington have been passed for speeds of up to 95 m.p.h. These lengths will obviously give the "Deltic" diesels even more chances to show their paces and their time recovery capabilities. On January 5 No. D9014 put up an excellent performance with the 8.00 Edinburgh–Kings Cross which, as the result of a derailment at Selby, was diverted via Knottingley. The train passed Doncaster 20min late, but with a time of 119min for the 156 miles from Doncaster to Kings Cross, an average of just over 78 m.p.h., arrived on time.

Engineering works on January 17 led to a complete possession of the line between Dewsbury Wellington Road and Ravensthorpe, with the consequent diversion of non-stopping trains between Huddersfield and Leeds over the Spen Valley Line. Intermediate stations were served by a shuttle diesel multiple-unit between Huddersfield and Mirfield and from Dewsbury to Leeds with a bus connection between. During the evening, late running and the maintenance of booked connections led to a 4hr gap in services between Leeds and Huddersfield. The Spen Valley line meanwhile has been proposed for closure and is to go before the TUCC.

Latest arrivals at Hull for breaking up have included Class A1 Pacifics Nos., 60143/7/50, Class A3 Pacifics Nos., 60036/45/70/80/5/91/2, "Jubilee" 4-6-0s Nos. 45568 and 45674 and "Royal Scot" 4-6-0s Nos. 46122/56. The "Castle" 4-6-0 reported last month as having arrived at Hull in fact got no further than Leeds, when it ran hot and was unable to continue its journey to Hull immediately.

[For E and NER information we are indebted to Messrs. W. Sharp, R. R. Northcott, "65576", "61627", A. R. Howe, R. L. Waite, E. Sargieson, F. Roebuck, "61010", R. A. Stowell, P. M. Forrow, J. R. Robinson, B. P. Reynolds, W. Hurren, D. Graves, R. Lumley and R. H. Corden.]

## Western

The number of steam workings in South Wales, particularly west of Cardiff showed a decline towards the end of January, although one or two regular steam turns remain, particularly the steel billets trains. A nucleus of 0-6-0 pannier tanks also survives at Neath shed to power local trip freights as far east as Bridgend. The surviving steam duties usually consist of general freights from West Wales to Margam, which are in the hands of 42XX and 66XX class locomotives and a few low-class freights to and from the Midlands, which are booked for haulage by LMR-based locomotives; on February 1 another "Castle" class 4-6-0 penetrated west of Cardiff when No. 5042 (85B) headed towards Swansea with the Kensington–Whitland empty milk train. Nevertheless, diesel troubles in South Wales led to a severe shortage of motive power during the early part of the year, to the extent that a number of freights were cancelled because there were no locomotives available to power them. On one January day alone no fewer than 87 diesel locomotives of a total allocation of about 280 were reported to be out of service from one cause or another including scheduled maintenance. Nevertheless the Wales v England Rugby International match at Cardiff on January 16 produced nine excursions from West Wales to Cardiff, all diesel hauled—six by Brush Type 4s, two by "Western" Type 4s and one with a Hymek Type 3. The increasing use of diesel locomotives, particularly Brush Type 4s, on up freights from South Wales through the Severn Tunnel has led to a decline in the need for banking between Severn Tunnel Junction and Pilning. By mid-February all but six of the de-rated Hymeks had been restored to 1,700 h.p.

The withdrawal of stopping trains between Swindon, Chippenham and Bath following the closure of intermediate stations on January 4 has released a number of diesel multiple-units for other services in the Bristol Division. Among former locomotive-hauled trains now covered by d.m.s.u are the 8.20 Bristol–Salisbury and the 12.18 return. This in turn has released diesel locomotives for other duties and to a considerable decrease in the number of surviving steam turns in the Bristol and Chippenham areas. The only regular steam turn at Chippenham appears to be an evening Bristol–Banbury freight. A Bristol D95XX Type 1 diesel took over the Chippenham pilot and trip freight duty from January 4.

In recent observations at Chippenham passenger train punctuality appears to have declined during December. Of 41 random observations of down trains between December 9 and January 1 the average lateness was 9.1min; 48 up trains in the same period averaged 7.6min late. The worst offender was the 18.45 Paddington–Bristol, which was noted on five occasions with an average lateness of 28min. Since the beginning of the year timekeeping of up trains has improved by the removal of a temporary speed restriction at an underbridge near Bath. Appearances of "Western" Type 4 diesels on Paddington–Bristol express passenger trains declined from about 75 per cent of 52 services observed in early November to 45 per cent of 49 services observed in late December. On December 26 a shortage of diesel power led to the working of "West Country" Pacific No. 34042 at least as far as the Bristol area with a Portsmouth–Cardiff train.

A correspondent amplifies the working of the cement trains from Westbury, which in fact run to the Blue Circle cement works at Exeter and not to Newton Abbot as reported in our January issue. The trains normally run on Tuesdays and Fridays, with rare exceptions, and on paths timed to leave Westbury either at 12.30 or 17.30. In both cases the locomotive, after turning at Exmouth Junction, returns light to Westbury. The train is diagrammed for diesel haulage but is about 90 per cent steam-worked. When a steam locomotive is employed, a stop is made at Taunton for water as Creech troughs were removed last year. Normally WR 4-6-0s are used, from a variety of sheds, although occasionally a WR 2-8-0 may be rostered for the duty.

Taunton steam shed is being demolished and Swindon steam shed, which was closed recently, is also likely to be demolished. Reading steam shed was also closed at the beginning of the year. Although the Taunton–Barnstaple line is fully dieselised, on paper at least, Ivatt Class 2 2-6-2Ts Nos. 41248/9 are occasionally used to cover d.m.u. failures, the first occasion that this class has been used on the branch. The remaining freight and milk trains are worked almost exclusively by NBL Type 2 diesel locomotives.

A correspondent corrects the note in the January issue that former GW 0-6-0s are no longer employed on passenger work and observes that four 22XX 0-6-0s are allocated to Templecombe for use on Highbridge–Evercreech services on the Somerset & Dorset line. An AC Cars four-wheeled railbus No. W79975 has arrived in the Yeovil area for use on the Yeovil Town–Yeovil Pen Mill service.

Steam power continues to be prominent in the London area particularly on domestic coal and returning empty trains. A high proportion are former LMS types with Stanier 2-8-0s and Class 5 4-6-0s being most in evidence, although 2-6-0 No. 42848 (8A) was noted at Southall on December 31.

[For WR information we are indebted to Messrs. A. R. Croucher, V. Bunting, G. H. Davies, D. G. Mannings, D. M. Smith, C. M. Napper, J. G. Stockley, N. J. Hales, D. W. G. Thomas, N. D. Arnold, P. Riley, P. N. Herbert, N. A. Feast, M. Haywood, R. D. Hancock, K. Glanville, A. G. Evans, P. E. Polton, J. R. Freshney and J. H. Sparkes.]

## Southern

Difficulties with the Oxted line diesel multiple-units continued into January and, although more BR/Sulzer Type 3 diesels appear to be available on both the Central and SW Divisions, steam workings on the Oxted line, especially between Oxted and Lewes, were more numerous during the first two weeks in January than in previous weeks. BR/Standard 2-6-4Ts were employed almost exclusively, particularly Nos. 80032/4 and 80142, which were noted on passenger and freight services. During December standard Class 3 2-6-2Ts Nos. 82024/8 were in use between Tonbridge and Eastbourne.

The Reading–Redhill–Tonbridge diesel service appears to have settled down after some teething trouble with the units during the first week of operation. The six diesel multiple-units on this service, Nos. 1201–6, are formed of a Hastings type motor brake second and trailer second and a former 2-EPB electric driving trailer. The driving trailers have had the three passenger compartments at the inner end of the coach converted to a luggage van by the simple expedient of removing the seats and partitions. The single doors are retained and the windows have been barred. The coaches have been obtained by disbanding Hastings short-frame units Nos. 1002–4 and 2-EPB units Nos. 5701/4/8/9/10/1. The spare electric motor coaches will be utilised as accident replacements on other sets.

The diesel multiple-units on the Brighton–Horsham service have also been in trouble and on at least two occasions during January it has been possible to maintain services only by turning back southbound trains at Shoreham to form the next northbound working; passengers for stations to Brighton have had to continue their journeys by coastal electric service.

The new Brighton express 4-CIG units continue on crew training duties on a diagram taking in Selhurst–Streatham Hill, Haywards Heath or Ford returning to Streatham Hill and Selhurst. The units are expected to enter revenue-earning service during March or April, but before then will undergo a number of modifications, including alterations to bogies and brake gear. Crew training with electro-diesels is expected to start on the Central Division in April.

A Western Region two-car diesel multiple-unit began crew training duties on the SR's South Western Division during January

between Eastleigh, Salisbury, Woking and Eastleigh. Salisbury station pilot duty was taken over from January 4 by a Drewry 204 h.p. diesel shunter, which replaced the Class 2 2-6-2Ts formerly employed.

Following the closure of Reading WR steam shed, most trains on the Reading–Basingstoke line have become diesel-powered, generally by Hymek Type 3s but also by "Western" Type 4s. Some trains worked by locomotives from other depots, however, remain steam-operated, notably the "Pines Express", which now seems to be regularly powered between Bournemouth and Oxford by a "Merchant Navy" Pacific.

Despite the number of Pacifics theoretically available for service, some of the Waterloo–Bournemouth expresses are underpowered with nothing larger than Class 4 4-6-0s. The tunnel repairs at Southampton Central are taking longer than expected and will continue until March 2 at least, together with the temporary alterations to train services in the Southampton area.

Shortage of WR power has led to the use of unusual locomotives on services between Weymouth and the WR. From January 1 to 7, "Merchant Navy" Pacific No. 35026 was regularly used on the 14.00 Weymouth–Yeovil, while on January 7, as no Hymek was available, Bristol Bath Road turned out BR/Sulzer Type 4 No. D67 on the 15.20 Bristol–Weymouth. Since the beginning of January all regular WR turns to Weymouth have been booked for diesel haulage, usually Bristol-based Hymeks and Brush Type 4s, although some locomotives from Cardiff Canton or Landore have also been noted. One of the Hymek Type 3s now has a regular working between Weymouth and Bournemouth with the 10.15 from Weymouth, returning with the Weymouth portion of the 10.30 from Waterloo.

Weymouth continues to be host to steam locomotives from the LMR on special parcels, broccoli and perishables trains. Stanier Class 5s have been most in evidence, but on January 30 "Britannia" Pacific No. 70000 (5A) arrived with a train of empty vans from Crewe and returned north with the Weymouth–Crewe parcels on February 1 —normally a duty for a Weymouth engine as far as Swindon. A week earlier on January, 23, "Jubilee" 4-6-0 No. 45674, although officially withdrawn, turned up at Bournemouth with a parcels from Crewe; it then piloted "Merchant Navy" Pacific No. 35030 from Bournemouth to Weymouth with the "Royal Wessex" and headed north the following day with an afternoon freight from Weymouth to Wolverhampton. On January 29 Class B1 4-6-0 No. 61237 arrived at Weymouth with a perishables train from York.

[For SR information we are indebted to Messrs. W. J. Parker, R. Humphries, A. Philip, P. J. Hancox, J. L. Russell, A. Wright, R. G. Knott, M. Haywood, P. T. Bance, R. & P. Davies, R. J. Ware, D. T. J. Rollason, C. D. Bennett, G. J. Murray, W. E. Brown, L. A. Tubb, R. Nash, D. Remnant, M. Sharp, G. R. Ibsen, G. Chester, D. F. Wellman, J. Press, J. Critchely, R. Godfrey and T. Reynolds.]

## Scottish

"Britannia" Pacifics penetrated to Aberdeen on a number of occasions in late December and January. On December 28 No. 70002 headed the 16.07 Aberdeen–Perth parcels and Nos. 70001/39 were both at Ferryhill, having worked in overnight from Carlisle. Both engines later worked light to Perth. Ferryhill A4 No. 60004 was unusually employed on January 11 when it deputised for a Type 4 diesel on the 12.07 Aberdeen–Edinburgh passenger; normally the A4s are confined to passenger and other duties on the West Coast route from Aberdeen.

The diagrams of the Inverness Type 2 diesels in the Aberdeen area have been changed again; the 16.17 Aberdeen–Perth parcels has reverted to steam haulage, generally a Perth Class 5 4-6-0, but the 18.44 Aberdeen–Manchester fish, which was normally powered by a Type 2 diesel and a Class 5 4-6-0, is now worked by two Inverness Type 2s.

The preserved Class D49 4-4-0 No. 246 *Morayshire*, restored to LNER livery, left Inverurie works in December and after storage at Kittybrewster shed until January 5 was noted being towed westwards through the Glasgow suburbs near Elderslie on the following day.

[For Scottish Region information we are indebted to Messrs. G. Mackenzie, D. W. Smith, F. S. Munro, I. R. Williams, C. G. Kirkwood, J. Thomas.]

## Workshops

A further 19 NBL Type 2 diesel-electric locomotives are expected to be re-equipped with Paxman engines during this year, although the conversion is not likely to be undertaken until the summer. So far, no decision has been reached about the remaining members of the class.

The Type 5 "Deltic" diesels are to be fitted with cast-steel bogie frames in an attempt to overcome the tendency of the present type to fracture. The new frames will be interchangeable with those on the same manufacturer's Type 3 locomotives. Meanwhile, "Deltic" No. D9012 has had its controls modified to reduce wheelslip troubles, and the remainder of the class are likely to be dealt with similarly.

Crewe ceased cutting up steam locomotives from the beginning of the year and will concentrate on repairs after the present order for new locomotives.

[For Workshops information we are indebted to Messrs. C. Wootton, M. J. Leah, N. A. Collins, D. R. Stopher, D. A. Rimell, M. C. Mellett, A. H. Thomas, W. J. McMillan, A. W. Hobson, I. N. Bruce and P. M. Boat.]

# motive power report

THIS list is correct to the following dates: LMR, December 26, 1964; ER, January 9, 1965; NER, January 2, 1965; ScR, December 26, 1964; SR, January 18, 1965; WR, January 23, 1965.

### MOTIVE POWER DEPOT CHANGES

The following Depots closed to Steam: Cricklewood West (14B) from December 14, 1964; Reading (81D) from January 4, 1965.

### NEW LOCOMOTIVES

**2,750 h.p. Diesel-electric Co-Co:** D1636/7/8/9/40/1/2/3/4/5/6/7/8/9/50/1-86A; D1785/8/90/1/3/4/5/6/7-41A; **1,750 h.p. Diesel-electric Co-Co:** D6949/50/1/2/3/4/5/6/7/8-86A; **1,250 h.p. Diesel-electric Bo-Bo:** D7515/6/7-16A, then to 14B; D7518/20-16A; **900 h.p. Diesel-electric Bo-Bo:** D8586-64B; D8610/1-41A; **650 h.p. Diesel-hydraulic 0-6-0:** D9522/3/4-81A; D9525/6-82A; **3,300 h.p. Electric Bo-Bo:** E3095-LMW.

### LOCOMOTIVES REALLOCATED

**London Midland Region: W/E December 5, 1964:** 42084-8F; 42664-NER; 42705, 42848/86, 42924-8H; 42945/51/5/64/80-9G; 43950/3-12D; 44035/57, 44155/88, 44210, 44377-2F; 44118, 44214/43, 44420-16G; 44137-Crewe Works; 44160-9E; 44358-8B; 45026/77-10F; 45252-9M; 45397-10F; 45402-8A; 45444-10C; 46430/59-5E; 47437-2K; 47649-5D; 48114/25/87, 48379, 48494, 48675-8F; 76020-5D; 78011/2/4/24/5-9G; 92008, 92104/31-8C; 92085, 92107-8H; D3770-9B; D5009/12-5A; D5243/4-16A; 12088-1F.

**W/E December 12, 1964:** 42075, 42209, 42478-2J; 42105/6/14-1A; 42233-1C; 43913-10G; 44192-12D; 44195-8B; 44355-16G; 44358-9G; 44425-9L; 44489-12D; 45344-6A; 45689-5A; 47432/5-1A; 47616-12A; 48063-15E; 48073-16C; 48254-16F; 48291-5D; 48353-6C; 48363, 48661-16B; 48679-10J; 76035/7/9/41/89-1A; 90080, 90284-8L; D43/4/7/9/50/1-14B; D152/6/8/63/5-16A; D4111-1E; D4112, D5087/9/90/2/3-1A; D5242/6-14B; D5247-16A; D7500/1/2/3/4/5-16F; D7515/6/7/68/9/72/3/4/5-14B; 12053-1C; 12058/64/7/8-1A.

**W/E December 19, 1964:** 3788-2B; 42103-1G; 44043, 44113, 44203-16G; 44334, 44414-16E; 44456-10G; 44525-Crewe Works; 44888, 45260, 45442-15E; 48464, 84013/4/26-9B; D2510-1E; D5240/1/5-16A.

**W/E December 26, 1964:** 42104-8H; 44500-8F; 47565-5B; 47577-12B; 48201, 48361-16E; 48479-8H; 90080-9G; 90274-8L; D2213/8/20-8H; D5014-9A; D5134-1F; D5202/37-16D; D5239/64-16A.

**Eastern Region: W/E December 12, 1964:** D9021-34G.

**W/E December 19, 1964:** D3452-41B; D3703-41A.

**W/E December 26, 1964:** Nil.

**W/E January 2, 1965:** Nil.

**W/E January 9, 1965:** 43092, 43108/44-41E; 61070, 61194, 61302-40E; 92038/40/1/4, 92140/1/4/5/6/8/9/78/9/80/2/95-41J; D1500/31/2/4/5/6/7/8/9/40/1/2/3/4/5-34G; D1549-41A; D1554/5/6/7/8/9/60/1/2/3/4/5/6/7-31B; D1568/9-40B; D1758/9/61/2/3/4/5-31B; D5546/7/75/6/7/8-32B; D5569/70/1/2/3/4-32A; D5586/7/8/9/90/2/5/6/7, D5622/3/4/5/6/7-34G; D5662/3/7/8/9/70/96/7/8-30A; D5679/80/1, D5853/4-40B; D5855/6-41A.

**North Eastern Region: W/E December 26, 1964:** 65859-51A.

**W/E January 2, 1965:** Nil.

**Scottish Region: 4 weeks ending December 26, 1964:** 44721/96-66A; 73105-65F; 76004/70/1, 80027-66A; D9021-ER.

**Southern Region: Period ending January 18, 1965:** 30535-70C; 30824/33/7/8/9/42-70D, then to 70B; 31405/11, 31816/31/62/6/73-70C; 34001/2/21/38-70A; 35007-70G; 76030/1/3-70D; 76053/5/66-70B; D2250-73F; D2252-73C; D2280-70G; D3040, D3226, D6532/44/8-70D.

**Western Region: Period ending December 27, 1964:** 2214, 3205-83D; 3836-82E; 4254-86B; 5971-81F; 6112-81C; 6622/58-86G; 6963-81D; D2128/43-85A; D2186-82C; D3819-86A, D4118-85A.

**Period ending January 10, 1965:** 3751-81F; 3816-86E; 3820/51-81C; 3864-86B; 4992/3-86E; 5971-85A; 5992-85B; 6106/34/5/61-81C; 6128-85B; 6661, 6876-88B; 6935-88A; 6938/53/63/91-81E; 6999-86E; 7205-88J; 7252-86E; 7904/19-85A; 9726-81C; 73044, 73162-81F; 73068-85B; 80035-83D; 80037/9-82F; D7072-81A.

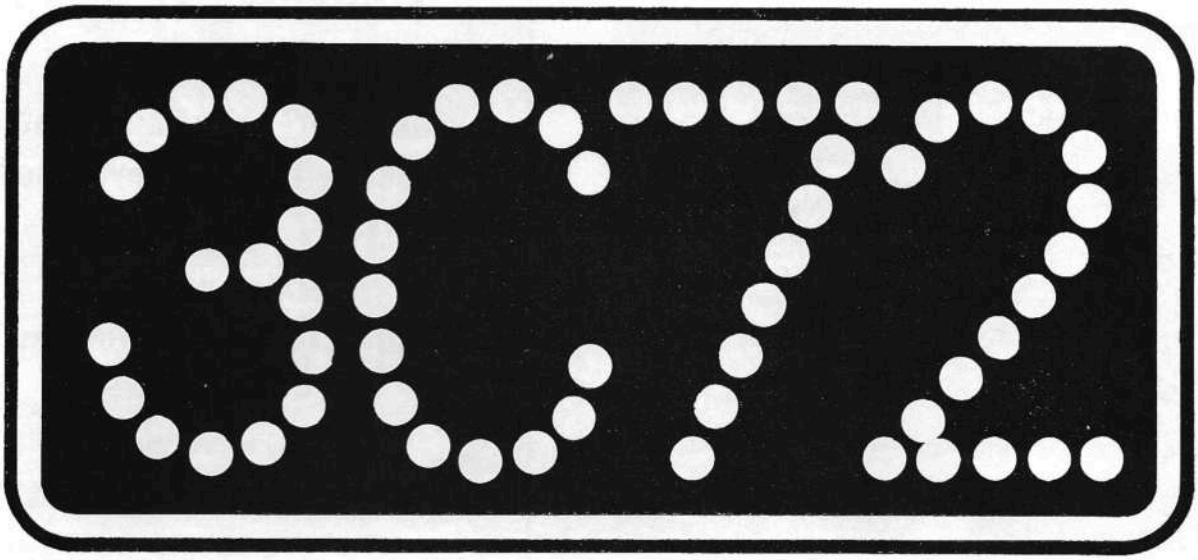
**Period ending January 23, 1965:** 3610-88J; 3615-85A; 3616/43/75/7-85B; 6910/61-81E; 8403/71, 9430-82E; 9615-88J; 9780-88B; D7087/91-82A.

### LOCOMOTIVES WITHDRAWN

2822/59/73/6, 3200, 3725/42/5/53/94, 3814/9/26/35/8, 4173, 4295, 4613, 4959, 5242/3, 5508/31/45/64/9, 5601/51/75, 5962/74/84, 6103/7/25/39, 6419, 6606/21/2/84, 6850/78, 6942, 7222, 7805, 7900/16/26, 8104, 8714/93, 9490, 9601/50, 9768, 33004, 42084/99, 42148, 42250/84/6/91, 42551, 42602/5/22/70, 42701/5/93, 42894, 42920/69/71/9, 43058/60/81/6/7, 43146/7/50/4/8, 43949, 44023/51/4, 44130/79, 44235/46, 44344/73/6, 44421/33, 44501/71/93, 44789/93, 44849, 45456, 45527/80, 45689, 46155, 46525, 47306/65, 48461, 48611, 48761, 48895, 49361, 49407/30, 60062, 60106/12/4/58, 60822, 60957, 61034/97, 61105/38/62/7, 61268/72, 61400, 62037/54/5, 63571, 63636, 63728, 63906, 64614, 73047/52/61, 73161/4, 75001, 90392, 90714, 92036, 92196, 92207/32/45, Departmental 11305.

### SOUTHERN ELECTRIC AND DIESEL-ELECTRIC UNITS

**Withdrawn:** 1002/3/4, 5701/4/8/9/10/1. **New:** 3-R; 1201/2/3/4/5/6; 4-CIG; 7301/2/3/4/5/6/7/8/9/10.

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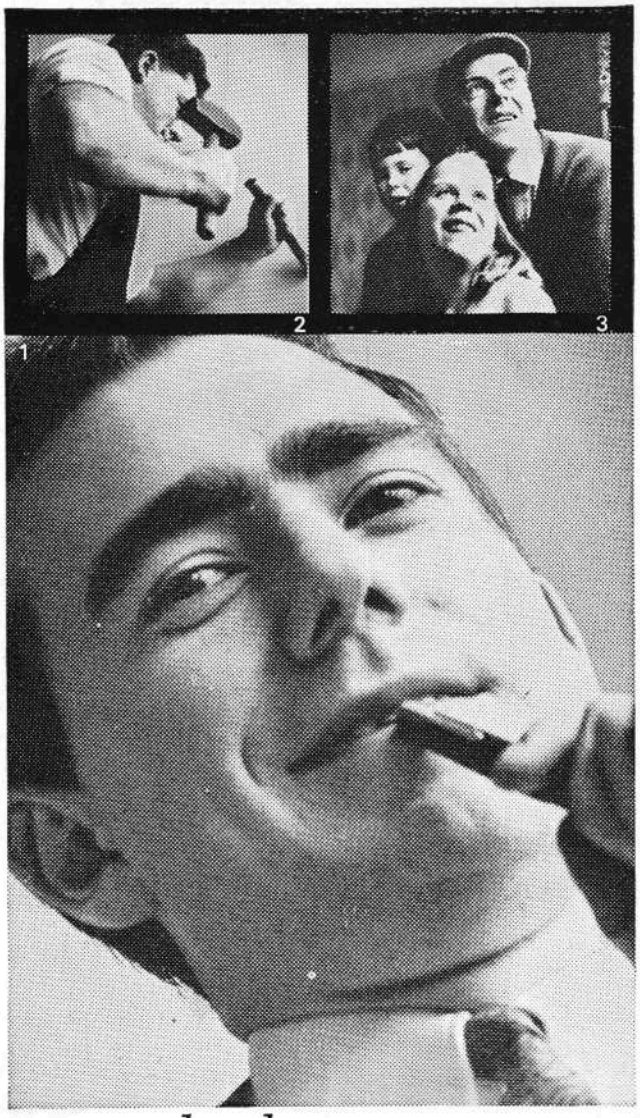

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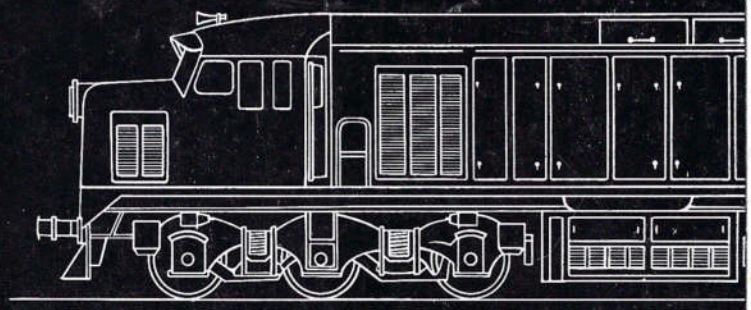

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